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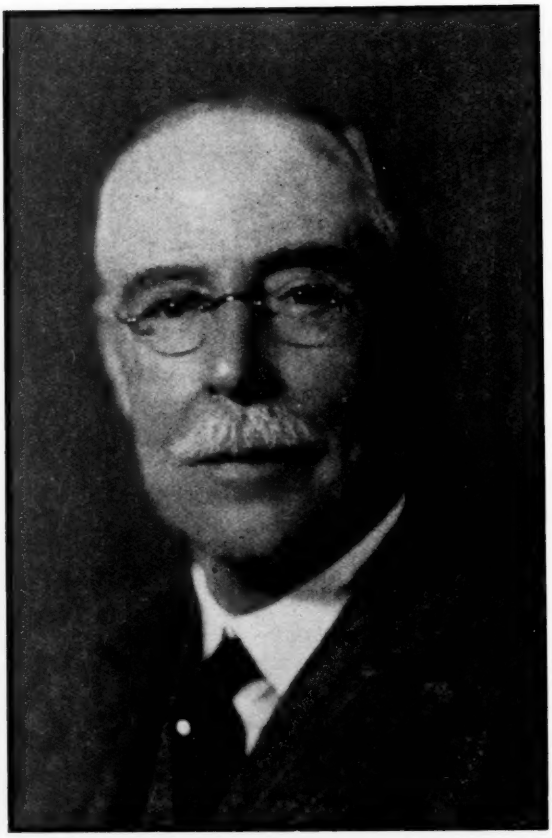

The Late Major Joseph Abson, D.S.O., T.D., F.R.C.V.S.

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NOVEMBER, 1934.

Obituary

THE LATE MAJOR JOSEPH ABSON, D.S.O., T.D., F.R.C.V.S.

LITTLE did we think, when alluding in THE VETERINARY JOURNAL for July last to the presentation made to Major Joseph Abson (the Treasurer of the Royal College of Veterinary Surgeons and a Member of Council for forty years) as a token of their esteem, by his brother Councillors, that we should be so soon called upon to record his tragic death, which occurred on the 12th inst., as a sequel to a motor-car accident. He certainly had his wish in that he died in harness, although at the age of seventy-six years it was questionable whether he was not taking some unnecessary risk in driving himself, and alone.

One of the best practitioners the veterinary profession has ever produced, Major Abson had, by his skill and genial manner, collected together at Sheffield one of the largest and best practices in the Kingdom; and yet, with all this responsibility on his shoulders, he found time to be a leader in the work of the Council, where his seat was rarely empty. His shrewd judgment had much to do with the setting of the finances of the Council on a safe footing, and although he would always agree to any much-needed improvement, he kept a tight hand on the College purse strings whenever attempts were about to be made to spend money unnecessarily. The fact that he was elected President, too, at different times, of the Lancashire and Yorkshire Veterinary Medical Associations respectively, and Local Secretary of the N.V.M.A. on the occasion of their meeting at Doncaster, illustrated full well the high opinion in which he was held by his neighbouring practitioners; and amongst the other official positions which he held were the Veterinary Inspectorships of the Ministry of Agriculture and the West Riding of Yorkshire. Being called up for military service as a Major of the Army Veterinary Corps Territorial Force, Major Abson did good work in France during the Great War, being rewarded with a D.S.O., and mentioned twice in despatches. The sympathy of the whole profession will be extended to his widow and son; and the many tokens of respect which accompanied his remains to the grave were silent evidence of the affectionate regard in which his name was held by his very large *clientèle* and his fellow citizens of Sheffield.

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Editorial

REPORT OF THE AGRICULTURAL RESEARCH COUNCIL (July, 1931, to December, 1933) *

In the July issue we drew attention to the report of the Government Committee on Cattle Diseases (Economic Advisory Council), emphasising the statement that "every veterinary surgeon should purchase a copy for perusal and retention on his bookshelf as a work of reference," and asserting that "the veterinary official whose duties include the inspection of dairy cattle will find something of interest on every page," especially on matters connected with the dairying industry and cattle diseases; not only an account of the trouble they cause to the cattle themselves, but also on account of their danger to man. At the price at which it was issued (2*s*. 6*d*.) it was a cheap text-book, and one wonders how many of our apathetic profession have as yet purchased a copy.

Another equally useful publication, in the shape of the Report of the Agricultural Research Council for the period July, 1931, to December, 1933, is now before us, and it is to be hoped that every student and member of the profession will purchase a copy, as it is equally useful to both.

The work published is of great value, too, as a *liaison* between the agriculturist and the veterinary profession, although it certainly does seem an anomaly that a Research Council, the half of whose report is devoted to matters connected with disease amongst stock, should have no member of the veterinary profession on its list.

One would have thought that advice from this source would have been an invaluable adjunct when such subjects as "heredity and genetics," "animal physiology and nutrition," and "diseases of animals," were being discussed, although generous tribute is given to the work which is being done by veterinary scientists at the respective research institutes and veterinary colleges. It would be invidious to single out too prominently the work done at one Research Institute more than another, but members of the veterinary profession can legitimately be excused if they point with pride to the work done on lamb dysentery and braxy of sheep, the mortality of the latter alone having been reduced from 6.73 to 0.64 per cent. by inoculation with a dead vaccine.

Apart from the purely veterinary subjects there is much interesting reading for the country practitioner, not only on the subjects of practical value, but in regard to what is being done in laboratory research; for his local influence is of immense importance as a means of *liaison* to interpret the decisions of such scientific bodies as the Agricultural Research Council to the owner of stock. The one cannot be complete without the other, and every member of the veterinary profession is grateful that the Government has at last awakened to the great necessity for urgent action to be taken to try to make up for the long black years when veterinary research was a thing almost unheard of, so shamefully was it neglected. This report of the Agricultural Research Council for the period July, 1931, to December, 1933, should, as already stated, be at once purchased and read by every veterinary surgeon; and afterwards kept close at hand as an interesting book of reference.

* To be obtained from H.M. Stationery Office, Kingsway, London, W.C.2.; 120, George Street, Edinburgh; 2, York Street, Manchester; 1, St. Andrew's Crescent, Cardiff; 80, Chichester Street, Belfast; or through any bookseller. Price 3*s*. net.

General Articles

RECENT ADVANCES IN THE CONTROL OF CERTAIN DISEASES OF SHEEP.

By W. S. GORDON.

Animal Diseases Research Association, Moredun Institute, Gilmerton, Midlothian.

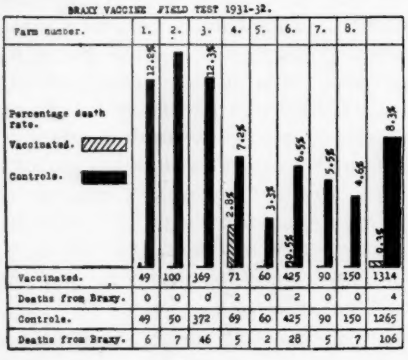
THE advance in our knowledge of sheep diseases has made rapid progress within recent years, probably because of the very direct methods of experimentation which can be adopted in their investigation. Thus the comparatively small value of individual sheep permits of the selection of typical cases of disease for destruction and post-mortem examination. Disease can be experimentally produced in that species of animal in which it naturally occurs, and the system of sheep husbandry which obtains in this country allows of controlled large-scale field experiments being carried out to determine the value of biological products for the prevention of the disease under investigation. Numerous examples of this type of work are well known, such as the work of M'Fadyean and Stockman on contagious ovine abortion, that of Gaiger on braxy, Dalling on lamb dysentery, Glover on contagious pustular dermatitis, Montgomerie on liver fluke, and the work at this Institute on louping-ill and tick-borne fever.

It is the purpose of this paper to provide a popular account of some of those disease problems which we have had under investigation, since we believe that in the future an increasing demand will be made on the veterinarian for advice regarding the control of sheep diseases.

Braxy and Braxy-like Diseases.

Sheep are especially susceptible to infection with the sporing anaerobic bacteria, and the diseases caused by these organisms are characterised by their sudden onset, acute and rapidly progressive course, and generally fatal outcome. In the majority of cases they are "soil infections" originating in the alimentary canal, the organisms gaining access to the digestive tract in the ordinary diet of the grazing animal. In Britain the term braxy is applied to a disease generally affecting yearling sheep and characterised by an inflammation of the fourth stomach. The organism incriminated as the cause of death in this disease was determined by Gaiger (1922) to be *Cl. septique*, which, under certain conditions not yet satisfactorily explained, penetrates the stomach wall and invades the body generally, producing a toxin which rapidly causes death. It is usually the well-conditioned animal, often a greedy feeder, which is attacked. The course of illness is so short that affected animals are rarely seen alive. In Britain the disease occurs in the western counties and particularly on hill farms; it is also prevalent in Ireland, Iceland, Norway and Denmark. Losses may occur at any

time from October to March, and a frosty morning is frequently followed by several deaths. On badly affected farms the mortality may be as high as 25 to 30 per cent. On diseased farms it is a common practice to winter the yearling sheep in non-braxy areas in order to avoid the braxy mortality; but following such a procedure, deaths due to braxy may generally be expected in these animals when they return to the affected farms. Various types of prophylactic vaccine have been tried in this and other countries, but the one generally adopted in Britain is a formalinised whole culture of *Cl. septique*. Inoculations are usually carried out early in September. Two inoculations are made with an interval of fourteen days between each. The injections are given subcutaneously inside the thigh, and the dose at each injection is 5 c.c. It is estimated that about a hundred thousand yearling sheep are vaccinated annually in Great Britain and Ireland. At the present time extensive field experiments are in progress to determine whether the improved vaccine now obtainable will produce a satisfactory immunity following one inoculation only, and the preliminary results suggest that a single inoculation will be effective. Fig. 1 depicts results obtained with the standard type of formalinised whole culture vaccine now in general use.



Farm number.	1.	2.	3.	4.	5.	6.	7.	8.	
Vaccinated.	49	100	369	71	60	425	90	150	1314
Deaths from Braxy.	0	0	0	2	0	2	0	0	4
Controls.	49	50	372	69	60	425	90	150	1265
Deaths from Braxy.	6	7	46	5	2	28	5	7	106

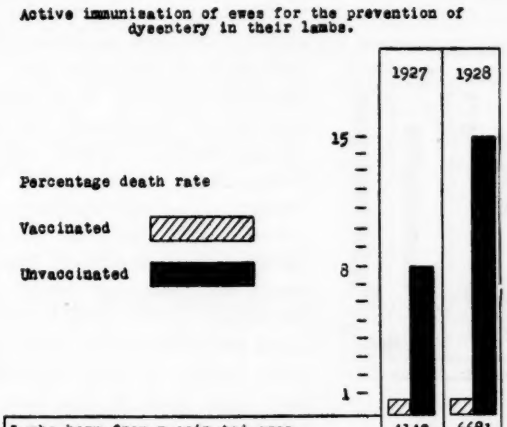
FIG. 1.

The conditions known as "infectious entero-toxæmia" and "struck" resemble braxy in the clinical feature of rapid course and generally fatal outcome. The former was first described by Bennetts as affecting sheep in Western Australia, and from its clinical resemblance to braxy it was spoken of as a braxy-like disease. The latter, a disease characterised by sudden death, which affects sheep on the Romney Marsh, was investigated by McEwen and Roberts (1931). The cause of death in these two diseases is attributed by these authors to a toxæmia following the excessive multiplication of distinct types of *Cl. welchii* within the contents of the small intestine. Infectious entero-toxæmia has now been recognised as the cause of certain cases of sudden death in sheep in different parts of Britain (Montgomerie and Dalling, 1933; and Gordon, 1934). Preventive measures for the control of these diseases are still in an experimental stage, but preliminary reports suggest that reliable methods of prevention may eventually become available for general use.

Lamb Dysentery.

Lamb dysentery has been known in localised areas of Britain for over a century, and its incidence varies on different farms in different seasons. Whilst

the disease incidence may appear to be decreasing in certain areas, it is on the increase in others, and, indeed, it occurs to a greater or less extent in most of the counties of Britain where large numbers of sheep are bred. The disease generally affects young lambs, especially those between five and fourteen days old. When the disease manifests itself in its acute form lambs commonly die at forty-eight hours old, whilst lambs even one month old may present symptoms and post-mortem lesions indistinguishable from true lamb dysentery infection. The death-rate on affected farms generally varies from year to year. In some



	1927	1928
Lambs born from vaccinated ewes.	4140	6681
Deaths from Lamb Dysentery.	36	59
Lambs born from unvaccinated ewes.	2213	5029
Deaths from Lamb Dysentery.	178	761

FIG. 2.

seasons the incidence is much heavier than in others, and instances are known in which a very heavy mortality in one season has been followed by a low death-rate the following season, and *vice versa*. Before preventive measures were adopted the annual loss of lambs from lamb dysentery in Scotland alone was estimated at £100,000 per annum. The cause of death in this disease is due to absorption from the intestine of the toxin of a specific type of *Cl. welchii*, isolated and identified by Dalling (1926). Under certain favourable conditions, as yet imperfectly understood, this organism multiplies in the bowel contents, and the toxin thus produced causes an inflammation and ulceration of the bowel wall. The characteristic lesion in lamb dysentery is ulceration of the mucous membrane of the intestine; sometimes the ulcers involve the entire substance of the bowel wall, with consequent peritonitis and localised adhesions. In very acute cases the lambs may die before ulceration of the intestine has developed, and in such cases the

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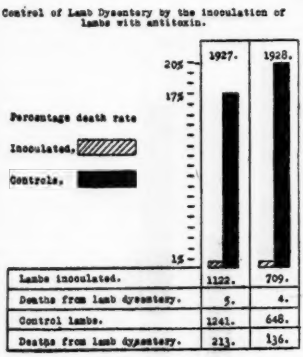
only lesion present is an acute enteritis. In some instances large portions of the intestine become gangrenous, with bubbles of gas in the bowel wall; in other cases small discrete ulcers are found scattered throughout the length of the intestine.

The symptoms vary according to the amount and potency of the toxin produced in the intestine, and the course may vary in duration from a few hours to several days, but it is not uncommon on dysentery farms to find lambs dead without any marked symptoms of illness having been previously observed. The lamb shows symptoms of abdominal pain, is inclined to lie, refuses to suck, has a "tucked-up" appearance, bleats frequently, and is disinclined to follow its mother. The fæces may be yellow at first, but are later chocolate-coloured, semi-liquid and tinged with blood; occasionally the dejecta consist almost wholly of blood, and the tail and hindquarters become soiled with the excrement. In flocks in which many lambs are affected with diarrhœa, accompanied by a heavy death-rate amongst lambs up to three weeks old, dysentery should be immediately suspected. A few clinical cases recover, and in all probability many lambs on a dysentery farm develop a mild infection which does not prove fatal; it has been found that a number of ewes on affected farms possess some degree of immunity to the lamb dysentery toxin, suggesting that they may be animals which have recovered from the disease. Such ewes are probably capable of transmitting a passive immunity to their lambs. This natural method of immunisation may possibly account for the gradual reduction in incidence of the disease on farms upon which it was at one time very prevalent. One of the methods at present adopted in the control of the disease, namely, active immunisation of the ewes, takes advantage of this natural phenomenon. The vaccine is a formalinised whole culture prepared from the causal organism, prepared by a similar method to that employed for the prevention of braxy. The ewes are inoculated twice with this vaccine, once in the autumn, about three weeks before the rams go to the hill, and again about ten days before lambing commences. By this procedure, the ewe develops antitoxin which can be detected in the first instance in her blood and later the antitoxin accumulates in high concentration in the colostrum. When the newly-born lamb suckles from its actively immune mother, it thus obtains a passive immunity by absorbing antitoxin from the colostrum. Absorption of antitoxin may continue for about the first four days of post-natal life, after which time the intestine becomes impervious to it. This method of immunisation has been highly successful in the control of lamb dysentery on the hill



	1927.	1928.
Lambs inoculated.	1122.	709.
Deaths from lamb dysentery.	5.	4.
Control lambs.	1241.	648.
Deaths from lamb dysentery.	213.	136.

FIG. 3.

farms of Scotland, and thousands of ewes are now vaccinated annually. In the practical application of the method inoculations may be conveniently made subcutaneously inside the thigh or on the under-surface of the tail, and it has been found by experience that after ewes have been vaccinated twice the vaccination need be repeated only once in succeeding years, and then just prior to lambing. Controlled field trials of this method of prevention were carried out by the staff at The Wellcome Research Laboratories, and the result of these experiments during two seasons is shown in Fig. 2.

Another method of controlling the disease which is extensively practised consists of passive immunisation of the lambs with a hyper-immune serum prepared in horses. Since lambs probably become infected shortly after birth, it is necessary to inoculate them if possible at birth, and certainly not later than the day they are born. Hundreds of thousands of lambs in Scotland have now been treated with such a serum during the past few years with highly satisfactory results. The result of field trials with lamb dysentery serum is depicted in Fig. 3.

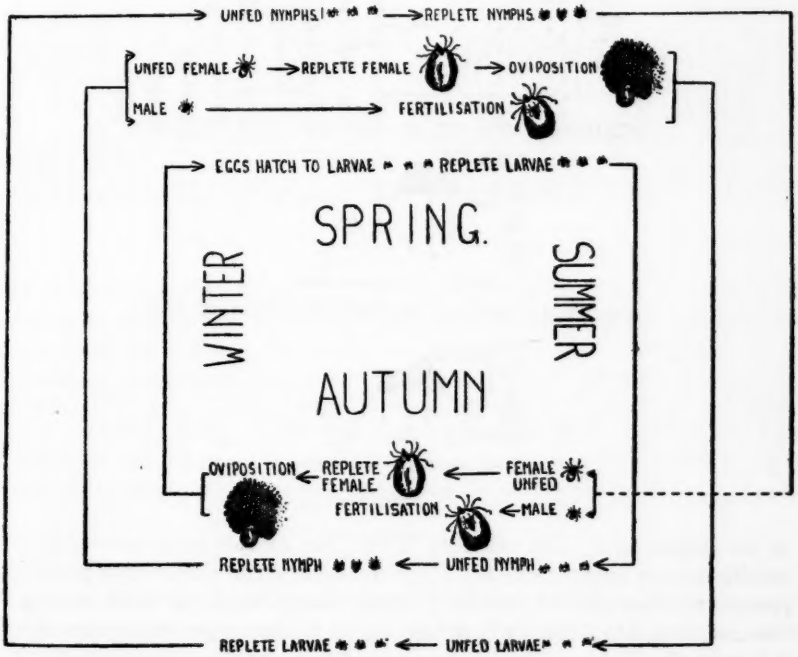


FIG. 4.—Diagrammatic representation of the life cycle of *Ixodes ricinus*, the Tick commonly found infesting sheep in Britain.

Louping-ill (an Encephalomyelitis of Sheep.)

Louping-ill, or trembling, is another disease prevalent amongst sheep on certain hill farms of Scotland and the northern counties of England. It is characterised by cerebellar ataxia and functional disorder of brain and spinal cord. The course varies from about one day in acute cases, to some weeks of lingering illness

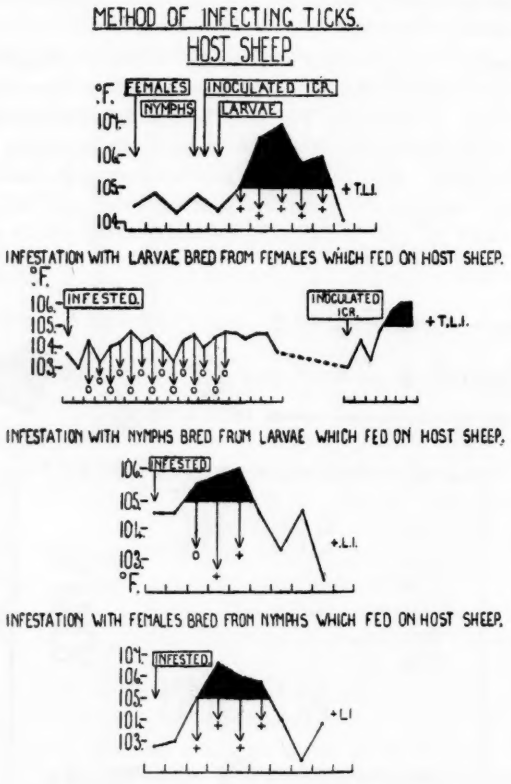


FIG. 5.

in the chronic form. The mortality is high, but animals which recover do not usually develop another attack. The association of the disease with particular pastures is well established, and sheep brought from a locality in which louping-ill does not occur into a louping-ill district are, in a large proportion of cases, liable to develop the disease. The tick, *Ixodes ricinus*, has long been suspected of being concerned in the transmission of louping-ill, and during the last fifty years many attempts have been made to incriminate it as the vector of the disease. Until

the cause of louping-ill was definitely determined (Pool, Brownlee and Wilson, 1930, and Greig *et al.*, 1931, and Gordon *et al.*, 1931), transmission experiments were necessarily inconclusive. When it became known that the disease was caused by a filterable virus which could be detected in the blood of affected animals during the febrile stage of infection, the investigation of the transmission of the disease became a comparatively simple matter, and it was shown by MacLeod and Gordon (1932) that larval and nymphal ticks which had fed on infected sheep were capable of transmitting the disease as nymphæ and females respectively. Females fed on infected sheep, however, have not so far been shown to transmit virus through their eggs to the resultant larvæ. A diagrammatic

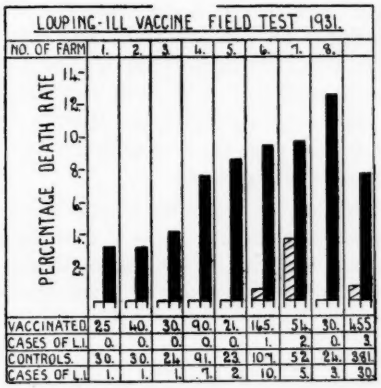

LOUPING-ILL VACCINE FIELD TEST 1931.
NO. OF FARM 1. 2. 3 4. 5. 6. 7. 8.
PERCENTAGE DEATH RATE
VACCINATED 25 40. 30 90. 21. 165. 54 30. 455
CASES OF L.I. 0. 0. 0 0. 0. 1. 2. 0. 3
CONTROLS. 30. 30. 24 91. 23 107 52 24. 381
CASES OF L.I. 1. 1. 4 7. 2. 10. 5. 3. 30.

FIG. 6.

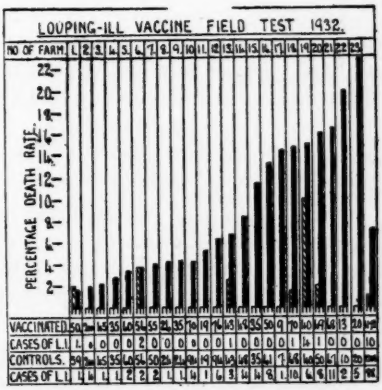


FIG. 7.

representation of the life cycle of *Ixodes ricinus* is shown in Fig. 4, while Fig. 5 depicts an example of the type of experiments employed to show that ticks are capable of transmitting louping-ill. At the present time experiments are in progress to determine if this disease can be controlled by vaccination of susceptible animals with a formalinised tissue vaccine prepared from the brain and spinal cord of infected sheep. Field trials with this vaccine were carried out in 1931 and 1932, and the result of these experiments is shown in Figs. 6 and 7. It is anticipated that this vaccine will be adopted for general use in 1935.

Tick-borne Fever.

During the course of the investigation of louping-ill it was found that sheep rendered immune to that disease were still liable to develop a febrile condition when grazed on a tick-infested farm (Gordon *et al.*, 1932). The cause of this condition was investigated, and it was found to be due to an infective agent present in the blood of infected sheep. It was also shown that the disease could be passed in series from sheep to sheep indefinitely by subcutaneous inoculation of

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blood from reacting sheep. In adult sheep this disease rarely proves fatal. It is characterised by an incubation period of about four days, followed by a febrile reaction which is sometimes very prolonged, but generally lasts about ten days. Infected sheep suffer a considerable degree of constitutional disturbance, accompanied by loss of bodily condition. In lambs the disease is more acute, and is probably responsible for considerable losses in these animals on badly affected farms. It is not uncommon on affected farms to find many crippled lambs. In many of these cases, we have been able to show that the animals were affected with tick-borne fever, accompanied by infection with pyogenic organisms. In such cases, joint-ill is of common occurrence, and cases have also been observed in which abscesses were present in the brain and spinal cord.

The tick, *Ixodes ricinus*, in its nymphal and female stages transmits this disease (MacLeod and Gordon, 1933). Practically 100 per cent. of the ticks which we have collected from hill farms were shown to harbour the infective agent of tick-borne fever, whilst only a small percentage of such ticks have been found to harbour the virus of louping-ill. In all probability tick-borne fever is by far the more prevalent disease, and on farms where ticks are present the majority of the sheep must become affected at some stage in their lives.

This disease is at present under investigation, and detailed reports will be issued later. At the present time there is no practicable method of controlling the condition, though it should be mentioned that we have evidence to show that both louping-ill and tick-borne fever could be prevented if a practicable method of tick eradication were evolved.

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IMMUNISATION AGAINST ANTHRAX WITH A SAPONIFIED CULTURE.

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VARIOUS methods of vaccination have been used from time to time against anthrax, but none except an agressin has succeeded in producing a long immunity without the use of live cultures. *B. anthracis* emulsions killed by heat or chemical

agents have failed to produce an immunity, and attenuated cultures of fixed virulence have generally been employed. Pasteur's first and second vaccines, although extensively used in some countries, have often failed to set up a strong immunity, while not infrequently severe reactions and death have resulted after the inoculation of the second vaccine.

With the introduction of spore vaccine made from attenuated and highly immunising strains of anthrax, a safer method of immunisation was indicated and a strong immunity set up. The efficacy of such a vaccine has been proved by Viljoen, Curson and Fourie (1928). Many workers, especially those on the Continent, consider the addition of certain glucosides to a virulent *B. anthracis* suspension assures a safer method of vaccination followed by a strong and lasting immunity. Recently experiments with this method of immunisation have been carried out in America, and favourable results have been reported. Amongst the English workers, however, little attention has been given to the glucoside vaccine as a means of vaccination against anthrax.

In Nigeria, anthrax has not until recently necessitated the use of a vaccine. Sporadic cases have been reported on various occasions, but it was not until 1932 that the first outbreak caused the death of cattle in numbers sufficiently large to warrant vaccination. The disease must have existed a long time before its presence was realised. In that particular season many deaths amongst cattle occurred, and a few horses, donkeys and sheep also succumbed. It was decided that a vaccine should be prepared, and after numerous experiments a spore vaccine was eventually made from a strain of Pasteur's second vaccine. The results of numerous tests confirmed the work of others that the sheep was the most suitable animal for the final immunity tests. Cattle were not suitable, for not infrequently they failed to react when inoculated with a virulent culture. Often only a local and thermal reaction occurred, which lasted two or three days, and the animals recovered. In our tests, although sheep proved to be more susceptible than cattle, over 25 per cent. were either immune or possessed a resistance sufficiently strong to protect against the injection of several lethal doses of virulent culture. In the latter cases only a slight local reaction occurred, accompanied by a rise of temperature which lasted a few days after the inoculation of virulent organisms. On the other hand, some sheep were found to be very highly susceptible. The inoculation of local goats indicated that they were more susceptible than sheep, the former frequently succumbed when inoculated with a single dose of sheep vaccine. All sheep and cattle used in these experiments were procured from various localities because it was not possible to obtain animals whose history was known. Hence the fixing of the minimum lethal dose and the estimation of the degree of protection afforded by vaccination were often contradictory. This necessitated frequent repetition of tests and the inoculation of many animals before the final product was issued. The vaccine was a single spore vaccine. The spores were grown on agar and washed off with 50 per cent. glycerine normal saline solution.

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Preliminary tests on guinea-pigs and rabbits indicated that it might be too potent, for some rabbits succumbed to an inoculation of 0.01 c.c. of vaccine. A single dose of vaccine for sheep protected in every instance against 50 M.L.D. of a local anthrax strain. Cattle vaccinated with quantities two and four times larger than the dose for sheep resisted 100 M.L.D. and more of our virulent strain. No attempt was made to fix the M.L.D. for cattle, as some resisted the inoculation of a virulent culture. The M.L.D. was only determined in sheep, hence this term, when referred to, applies to the minimum dose of a virulent anthrax broth culture which killed the majority of these animals. The vaccine produced in cattle and sheep a local reaction, and in one of the final tests a well-marked thermal reaction was also observed in one of the vaccinated cattle. The reactions disappeared after a few days. The local reaction varied following vaccination, and appeared to be quite irrespective of the quantity or strength of the vaccine injected. The reaction set up by a vaccine is not necessarily an indication of its immunising properties. It has been demonstrated that a severe reaction may be followed by a poor immunity. During 1932 over two thousand cattle were inoculated under field conditions. Some of the reactions were severe, but an immunity sufficient to protect against local infection was evidently set up, since no breakdown was reported. A few inoculations with formalinised blood of an animal which had succumbed to an inoculation of *B. anthracis* suggested that an immunity could be set up. The blood was drawn shortly before death and mixed with an equal part of 0.6 per cent. formalin citrate solution. Sheep inoculated with 10 c.c. citrated formalinised blood which had been kept on ice for twenty-four hours did not react to the inoculation. Fourteen days later these sheep were injected with 10–50 M.L.D. of anthrax bacilli. Those which received 50 M.L.D. all succumbed, of those which received 20 M.L.D., 70 per cent. survived, and of the lot which received 10 M.L.D., 75 per cent. lived. We did not pursue this method of immunisation in view of the fact that other workers have proved that both blood and œdematous fluid sterilised by certain chemicals possess immunising properties, but the immunity is not as strong as that set up by spore vaccine. For twelve months after the last batch of spore vaccine was issued, there was no further need for vaccination. During that time the vaccine had been stored in a cold room. A further issue was then required. Prior to issue, about 300 cattle were inoculated, very severe reactions resulted, and four animals died. Rabbits also died after the injection of 0.01 c.c. of vaccine. The vaccine was too potent, so it was discarded. It is difficult to account for the severe reactions, as a greater attenuation of the vaccine was expected. A vaccine was still in demand, and as the time necessary to produce another spore vaccine would be considerable, we turned our attention to the production of glucoside vaccine in view of the excellent results claimed by Continental and American workers.

It is not the purpose of this article to discuss and compare the advantages and disadvantages of the various vaccines and methods of vaccination against anthrax, but to present our results when the glucoside saponin was added to a virulent

suspension of anthrax organisms, then inoculated into animals and followed by an immunity test.

Mazzuchi (1931), of Milan, suspended virulent anthrax spores in a medium which when injected into an animal caused a tissue reaction and served as a barrier against the spores. This barrier caused a delayed absorption; it prevented a generalised infection and set up a protracted antigenic stimulus which helped to increase immunity. He obtained this reaction by the addition of saponin to a virulent anthrax suspension. This worker later used an attenuated culture for general vaccination and commercialised this vaccine under the name of "Carbozoo." This vaccine has been extensively used in Italy with remarkable results. Gerlach (1931), working in Austria, confirmed Mazzuchi's work. Hruska (1931) also demonstrated the possibility of vaccinating animals with virulent anthrax organisms mixed with 10 per cent. saponin, and in a later publication

TABLE 1.

Animal	Vaccinated	Dose: 2 per cent. saponin spore vaccine	Result
Rabbit 1	27.4.34	2 c.c.	Severe swelling within 24 hours; lived
,, 2	,,	2 c.c.	Severe swelling within 24 hours; lived
,, 3	,,	0.5 c.c.	Pronounced swelling within 24 hours; lived
,, 4	,,	0.5 c.c.	Pronounced swelling within 24 hours; lived
Guinea-pig 5	,,	1.0 c.c.	Severe swelling within 24 hours; lived
,, 6	,,	1.0 c.c.	Severe swelling within 24 hours; lived
,, 7	,,	1.0 c.c.	Severe swelling; died anthrax
,, 8	,,	1.0 c c.	Severe swelling; died anthrax
,, 9	,,	1.0 c.c.	Severe swelling within 24 hours; lived
,, 10	,,	1.0 c.c.	Severe swelling within 24 hours; lived
,, 11	,,	0.25 c.c.	Pronounced swelling within 24 hours; lived
,, 12	,,	0.25 c.c.	Pronounced swelling within 24 hours; lived
Rabbit 13	Control	0.1 c.c.) Spore vac-	Died anthrax
Guinea-pig 14	Control	0.01 c.c.) cine only	Died anthrax

Spore vaccine 1,000 mils. per c.c.

(1934) proved it to be of real practical value. Staubb (1932) considered that the intradermic inoculation of saponified organisms produced a stronger immunity than by the subcutaneous route. His experiments showed that when rabbits were inoculated subcutaneously with 10 per cent. saponified virulent anthrax organisms they did not succumb to the infection, nor was an immunity conferred. Juric (1933) was unable to confirm Hruska's results because he also failed to immunise rabbits after the injection of 10 per cent. saponified suspension of virulent organisms. It has been recorded by workers in other fields that it is difficult to immunise rabbits or guinea-pigs against anthrax. We have failed to kill rabbits which were inoculated with 2 c.c. of virulent organisms suspended in 2 per cent. saponin, and only two guinea-pigs out of six succumbed after the inoculation of 1 c.c. of a similar solution. The local reactions were, however, extremely severe. Without the addition of saponin, 0.01 c.c. of the same suspension killed both rabbits and guinea-pigs.

The above workers, as well as Weidlich (1933) have immunised many thousands

of cattle with virulent vaccine suspended in either saponin or digitonin, or a mixture of the two glucosides. Eichorn and Lloyd (1934), in America, have also immunised horses, cattle, and sheep with "Carbozoo." These authors preferred a 2 per cent. solution of saponin to a 5 per cent. on account of the smaller tissues reaction set up by the former. In our experiments we used a second Pasteur vaccine, which after prolonged incubation showed nearly 100 per cent. sporulation. This vaccine was too virulent to inoculate cattle. A suspension in normal saline consisting of about 1,000,000,000 organisms per c.c. was prepared, and saponin was added to make the final concentration 2 per cent. Table 1 shows the results after vaccinating guinea-pigs and rabbits. Within twenty-four hours severe local reactions occurred which increased in size up to seventy-two hours. The animals which received larger doses showed swellings which were three inches in size and plaque-like, and some became necrotic.

TABLE 2.

Animal	Vaccinated	Dose: 2% saponin spore vaccine, 1,000 millions per 1 c.c.	Immunity test broth culture, anthrax, 24 hours old		Result
Sheep No.	Date		Date		
387	27.4.34	0.25 c.c.	9.5.34	0.02 c.c.	Lived
388	,,	,,	,,	,,	,,
389	,,	,,	,,	,,	,,
390	,,	,,	,,	,,	,,
391	,,	,,	,,	,,	,,
392	,,	,,	,,	,,	,,
393	,,	0.5 c.c.	,,	,,	,,
394	,,	,,	,,	,,	,,
395	,,	,,	,,	,,	,,
Controls					,,
404	—	—	,,	0.02 c.c.	Anthrax
398	—	—	,,	,,	,,
Sheep No.					
397	11.6.34	0.5 c.c.	26.6.34	0.02 c.c.	Lived
407	,,	,,	,,	,,	Anthrax
408	,,	,,	,,	,,	Lived
409	,,	,,	,,	,,	,,
410	,,	,,	,,	,,	,,
411	,,	,,	,,	,,	,,
413	,,	,,	,,	,,	,,
414	,,	,,	,,	,,	,,
415	,,	,,	,,	,,	,,
416	,,	,,	,,	,,	,,
417	,,	,,	,,	,,	,,
418	,,	,,	,,	,,	,,
419	,,	,,	,,	,,	,,
420	11.6.34	1 c.c.	26.6.34	0.02 c.c.	Lived
421	,,	,,	,,	,,	,,
422	,,	,,	,,	,,	,,
424	,,	,,	,,	,,	,,
425	,,	,,	,,	,,	,,
426	,,	,,	,,	,,	,,
427	,,	,,	,,	,,	,,
428	,,	,,	,,	,,	,,
429	,,	,,	,,	,,	,,
431	,,	,,	,,	,,	,,
Controls					
405	—	—	,,	0.02 c.c.	Anthrax
406	—	—	,,	,,	,,

Table 2 shows the results of sheep vaccinated, followed ten days later by an immunity test. The sheep were inoculated subcutaneously in the thigh. In this test one sheep failed to be immunised after the inoculation of 0.5 c.c. of vaccine. A most constant feature after vaccination was the striking immediate effect produced. Many of the sheep laid down, and for a few minutes refused to move and were lame. Lameness continued up to forty-eight hours, and a hard swelling formed at the seat of inoculation. The swelling reached in some animals the size of a walnut, and tenderness was present in a few cases up to the twelfth day.

Cattle were next inoculated subcutaneously behind the shoulder with quantities of vaccine varying between 2 c.c. and 0.5 c.c. All showed swellings 6 in. to

TABLE 3.

Animal	Vaccinated	Dose of 2% saponin spore vaccine, 1,000 millions per 1 c.c.	Immunity test, virulent culture, 24 hours old		Result
Ox No.	Date		Date		
6,673	19.5.34	0.5 c.c.	29.5.34	0.04 c.c.	Lived
6,674	,,	,,	,,	,,	,,
6,691	,,	,,	,,	,,	,,
6,434	,,	,,	,,	,,	,,
6,433	,,	,,	,,	,,	,,
6,169	,,	,,	,,	,,	,,
Controls Sheep No.					
399	—	—	,,	0.02 c.c.	Anthrax
401	—	—	,,	,,	,,

10 in. in diameter within twenty-four hours. The swellings were very painful, but in the course of a fortnight subsided. Table 3 shows the result of an immunity test which is typical of others following vaccination with a smaller quantity of vaccine. Many cattle have since been vaccinated, but not in a single instance has an animal succumbed after vaccination or later, when injected with a virulent culture.

Recently Hruska (1934) used the hairless undersurface of the tail, about an inch above the anus for the site of inoculation. We have also inoculated cattle at this site. Hard flat swellings up to two inches in diameter and round swellings the size of a golf ball occurred within twenty-four hours after vaccination. The swelling does not appear to cause any pain, and after a fortnight the largest swelling had completely subsided. In some animals there was only a very slight indication of a local reaction. In a later series of inoculations we employed an inoculum containing about 1,000 million organisms in 0.5 c.c. of saponified saline solution, but the reactions were not correspondingly reduced when the lesser quantity of saponin was injected. Table 4 shows the results of a few typical tail inoculations, followed by an immunity test.

In our final test we inoculated goats. It has already been stated that we found the goat very susceptible to anthrax. Some animals succumbed when inoculated with a smaller quantity of an attenuated spore vaccine than the

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vaccinating dose used for immunising sheep. On account of their high susceptibility we were unable to use these animals for estimating the standard dose of spore vaccine for sheep or cattle. Many methods of vaccination have been attempted, but the only safe vaccine for goats appears to be, according to Viljoen, *et al.* (1928), one which has been made from a mild strain which does not kill guinea-pigs even when inoculated in large doses.

Our goats were now subjected to a most severe test because many were inoculated when in an advanced stage of pregnancy. They were vaccinated with the same strength of vaccine (1,000 million organisms in 0.5 c.c.) used in our later series

TABLE 4.

Animal	Vaccinated	Dose of 2% saponin spore vaccine, 1,000 millions per c.c.	Reactions	Immunity test virulent broth culture of anthrax		Result
Ox No.	Date			Date		
6,952	16.8.34	0.5 c.c.	1½″×½″	1.9.34	0.04 c.c.	Lived
6,953	,,	,,	slight	,,	,,	,,
6,957	,,	,,	slight	,,	,,	,,
6,956	,,	,,	*nil*	,,	,,	,,
6,951	,,	,,	very slight	,,	,,	,,
6,955	,,	,,	*nil*	,,	,,	,,
6,954	,,	,,	2″×1½″	,,	,,	,,
6,774	23.8.34	1 c.c.	All showed reactions varying from slight to 2″×1½″	1.9.34	0.04 c.c	Lived
6,989	,,	,,		,,	,,	,,
6,998	,,	,,		,,	,,	,,
7,001	,,	,,		,,	,,	,,
7,000	,,	,,		,,	,,	,,
6,999	,,	,,		,,	,,	,,
6,495	,,	,,		,,	,,	,,
6,988	,,	,,		,,	,,	,,
Controls Sheep No.						
436	—	—	—	,,	0.02 c.c.	Anthrax
437	—	—	—	,,	,,	,,

of inoculations in cattle and sheep, and with the same dose which sheep had received. Three goats underwent even a more severe test: each was inoculated with 1 c.c. of saponin anthrax suspension, which was equivalent to the largest quantity of vaccine injected into cattle. The reactions following the thigh inoculations were similar, but milder than those observed in sheep. The tail reactions were observed within twenty-four hours after inoculation. The swellings were flat and not round as seen in cattle, and were accompanied by heat and slight pain on pressure. There was no difference in the reaction set up after the injection of 0.5 c.c. and 1 c.c. of saponin suspension. *None of the goats succumbed after vaccination, nor did any of the pregnant goats abort.* An immunity test was applied ten days later by injecting 0.02 c.c. of a twenty-four-hours' virulent broth culture of anthrax bacilli.

The ten goats which were vaccinated in the thigh resisted the inoculation of a virulent culture. Of the ten goats vaccinated in the tail, three succumbed when inoculated with virulent culture. One of these (302) received the larger dose

of vaccine. In this animal no protection was afforded by the larger dose of vaccine, as it died on the same day as the control. It is unlikely that every one of the ten goats inoculated in the tail was more susceptible than the goats inoculated in the thigh, hence there is an indication that vaccination in the thigh sets up a stronger immunity than vaccination in the tail

As double the dose of vaccine when inoculated *in the tail* only protected two animals out of three, and the smaller dose protected five out of seven, we are inclined to think that individual susceptibility explains this result. If a goat is highly susceptible the quantity of vaccine injected in the tail does not appear to influence the resistance set up. It is probable, however, that a very high percentage of these tail inoculated animals would resist an infection under natural conditions. All the animals were subjected to an extremely severe vaccination and immunity test. The number of goats inoculated was small, but sufficient to show that a safe and strong immunity can be set up, while it allows the inoculation of a high concentration of virulent organisms which is not possible with other methods of vaccination.

Table 5 shows the results of the test.

TABLE 5.

Animal	Vaccinated	Dose of 2% saponin spore vaccine, 1,000 millions per ½ c.c.	Reaction	Immunity test virulent broth culture, anthrax		Result
Thigh Inoculations:						
Goat No.	Date			Date		
803 P.	22.8.34	0.5 c.c.	All showed painful local reaction	1.9.34	0.02 c.c.	Lived
866 P.	,,	,,		,,	,,	,,
868	,,	,,		,,	,,	,,
875	,,	,,		,,	,,	,,
880	,,	,,		,,	,,	,,
883	,,	,,		,,	,,	,,
884	,,	,,		,,	,,	,,
888	,,	,,		,,	,,	,,
889 P.	,,	,,		,,	,,	,,
890 P.	,,	,,		,,	,,	,,
Tail Inoculations:						
Goat No.						
869 P.	22.8.34	0.5 c.c.	All showed flat swellings, heat, and slight pain	1.9.34	0.02 c.c.	Lived
876 P.	,,	,,		,,	,,	,,
877 P.	,,	,,		,,	,,	Anthrax
897 P.	,,	,,		,,	,,	,,
301 P.	,,	,,		,,	,,	Lived
304 P.	,,	,,		,,	,,	,,
305 P.	,,	,,		,,	,,	,,
302	,,	1 c.c.		1.9.34	0.02 c.c.	Anthrax
303	,,	,,		,,	,,	Lived
306	,,	,,		,,	,,	,,
Controls						
Sheep 436	—	—		—	0.02 c.c.	Anthrax
437	—	—		—	,,	,,
Goat 902	—	—		—	,,	,,

P. = Pregnant.

Conclusions.—Saponin added to virulent anthrax organisms and inoculated into cattle, sheep and goats subcutaneously, set up a local reaction which prevented generalised infection. In cattle the reactions are not sufficiently severe to prohibit this method of vaccination. The under surface of the tail is the best site for vaccination in cattle. The reactions are very much milder, and are unaccompanied by pain. In some animals there was no indication of a local reaction. A strong immunity is induced ten days or less after vaccination. The reactions are not sufficiently severe to prevent animals working after vaccination. This applies principally to the tail inoculation. The preparation of a saponified vaccine is simple, and allows the inoculation of virulent organisms. It is a practical and safe method of vaccinating the more susceptible animals. Pregnant animals, even amongst the most susceptible, can also with safety be vaccinated, and a strong immunity conferred. There is an indication that a greater immunity is set up in goats after vaccination in the thigh than in the tail.

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NASAL AND BRONCHIAL CATARRH.

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DOCTORS have been called to book for their apparent helplessness in preventing human subjects from " catching cold." When one considers the almost innumerable influences at work that may be responsible for a man, woman or child catching cold, it is difficult to see how any great advance can be made in the matter of prevention. Here in the industrial North probably at least 50 per cent. of the inhabitants are affected in a more or less degree with nasal or bronchial catarrh. The fine particles of cotton fibre in the card rooms, the variation of temperature from 90 degrees in the mills to that of the outside atmosphere, is no doubt responsible for a lot of catarrh. Damp atmosphere and impurities in the air, acid fumes

(indicated by the quickness with which ironwork rusts and crumbles) and sudden variations in temperature, no doubt also the household draught, are all factors in the prevalence of catarrh.

Animals do not appear to be so subject to catarrh as human beings. Whether the reasons are that their mucous membranes are better protected against adverse influences both anatomically and structurally than that of human beings, or that their constitutions are better and more natural, and not damaged by cocktails, excessive and severe exertion causing overheated bodies, dancing in hot ball-rooms, sun bathing on inclement days, or night clubs and lowered vitality, it is difficult to determine. Recently as a preventive of catching cold, large rooms where medicated inhalations can be breathed for a time have been advocated as preventives and cures for catarrh. The idea is that they should be used regularly like Turkish baths or spa treatment.

During the last twenty-four years we have had charge of a stud of about eighty-five horses, and during that time there have been six outbreaks of nasal and bronchial catarrh attacking on an average ten to twelve horses. We have had the advantage of three loose boxes into which medicated steam (tincture of benzoin, eucalyptus, terebene) can be passed copiously through holes in the walls of the loose boxes. We think that this factor has materially aided the recovery of some of the worst cases. But besides this, in the last decade, owing to the advent of motor traction, there has been a great drive by the authorities to get these horses well and at work as quickly as possible. Our treatment has been carbonate of ammonia, acetanilid, nux vomica and liquorice root as balls, and nitrate of potash and hyposulphite of soda in the drinking water, or as an electuary. Occasionally we have had to apply oil of cantharides to the sides and throat, and to rug the horses up.

But is this all that the thinking man can do ? When he enters a box and sees his patient with dirty, stringy and perhaps stinking discharge coming from its nose he surmises that something more might be done. To this end we have syringed out the nostrils repeatedly with a 1 per cent. solution of ammonium chloride, and have given frequent injections up the nostril, with a powder blower, of boracic acid and iodoform. In some of the worst and lingering cases we have used solvellæ tablets of nasal eucalyptol co. dissolved in water. Massage of the nostrils has also been beneficial. With this treatment we have had no sequelæ of nasal gleet, or complications of strangles, nor any deaths, although many of the animals have been critically ill, and even the veterinary surgeon may sometimes wonder how with the escape of pints and pints of " snot " from a horse's nostrils the animal may still recover and go to work, and do this normally for many years afterwards.

In dogs and cats with catarrh we have frequently found benefit from the ammonium chloride injections up the nostrils with an eye-dropper, and a good syringing out of the throat with the same solution. The animal needs to get rid of the muck, and not have its nose and throat blocked with the objectionable

secretion. Occasionally smearing the nose with vaseline mixed with camphor and eucalyptus oil seems to help. For the bronchial catarrh, elixir Kugloid co. (Huxley) is an excellent remedy. It contains beechwood creosote, quinine, eucalyptol and syrup glycerophosp. co.

This record is only that of a general practitioner, but it may be stated that most of us metaphorically work under that " fierce light that beats upon a throne," and face competition within and without, and cannot go to sleep as if we were in a sheltered position.

A SAFE MILK SUPPLY

The Report of the Committee on Cattle Diseases (Economic Advisory Council).

[Report of a Special Committee of the Medical, Science, and Veterinary Councils of the People's League of Health (Incorporated).]

(1) The People's League of Health has in previous reports advocated a larger use of milk as food, more especially for children ; the development of herds of milk-yielding cows certified as free from disease ; and the production and distribution of a milk supply which is alike nutritious, clean and safe. The League takes the present opportunity to affirm these aims, and to support all endeavours—whether in the shape of legislation or administration or research—calculated to secure them.

(2) With these objects in view, and in the interest of the Public Health, the League gladly recognises the Report of the Committee on Cattle Diseases as a valuable and practical contribution to the establishment of a safe milk supply, and in a large measure agrees with the recommendations of the Committee.

(3) In particular, the League notes with satisfaction the proposal that all milk offered for human consumption should as a prime necessity attain a fixed standard of cleanliness ; also that every bottle or container in which milk is offered for sale should be labelled or marked in a fashion which accurately announces to the purchaser the character and quality of its contents.

(4) The suggested grading of milk under four designations, namely, " certified," " pasteurised," " sterilised," " milk (uncertified)," the League accepts generally as an improvement on the terms now in use, but this acceptance is qualified in two respects, namely : (*a*) The League is satisfied that there is a desire on the part both of the medical profession and of the public to be able to obtain the highest quality of milk with the additional protection of pasteurisation, and therefore urges that the existing legal restriction on the sale of " certified milk " which has been pasteurised should be withdrawn. Further, it has to be recognised that the existing term " Grade A, T.T." enjoys a distinct measure of public use and confidence, and that the producers of this variety of milk have a substantial business interest and goodwill in its sale. To meet these legitimate considerations the League suggests that the proposed new term " certified " should be " Certi-

fied T.T." Consumers of the present " Grade A, T.T." would thus continue the term " T.T." with which they are familiar, and reasonable business claims would not be prejudiced. (*b*) The fourth of the new designations, " Milk (uncertified)," is raw milk not obtained from tubercle-free herds, and may therefore be the medium for the conveyance of tuberculosis or other infections. Hence to the proposed label " Milk (uncertified) " the League strongly urges the addition of the phrase " should be boiled before use."

(5) In connection with the proposals (*a*) and (*b*) of paragraph 4, the League, while recognising the importance of tuberculosis as the most obvious of the milk-borne diseases against which protection is required, is bound to recall the possibility of other infections (undulant fever and septic sore throat, for example) conveyed through milk. Altogther, it is right to say that milk, and especially milk collected from uncertified herds, if not pasteurised or sterilised, ought not to be offered to the public without an intimation that to make such milk safe it ought to be boiled before use.

(6) The League, as stated in its 1932 Report, being satisfied that the nutritive value of milk is not effectively prejudiced by pasteurisation, now welcomes the statement in the Report of the Cattle Diseases Committee, that whatever objections may exist on this plane would be " easily outweighed by the saving in human life and suffering which would result " from the substitution of pasteurised for raw milk. In this respect, too, the League again emphasises the necessity for official inspection and control of pasteurising and sterilising plants, and strongly supports the Cattle Diseases Committee's Report on these points. Manifestly, if the full protective values of these processes are to be secured they must be applied at a high level of efficiency.

(7) The League in 1932 stated its entire sympathy with the claim for further research in reference to the prevention of disease in cattle, and to various aspects of the milk supply, and it cordially endorses the position as stated by the Cattle Diseases Committee. The recognition of this claim is obviously quite consistent with the demand, that while awaiting further knowledge practical steps are necessary to avoid the risks of the immediate situation.

(8) The League does not share the pessimistic view expressed by the Committee in reference to the control of contagious abortion, Johne's disease, and streptococcal mastitis; existing methods, if systematically applied, offer a fair prospect of success, and should be included in any programme directed to the eradication of disease in cattle.

(9) The League notes with satisfaction that the Cattle Diseases Committee recognises in principle the proposal of the League that, subject to certain limitations, local health authorities should be empowered to resolve that within their respective areas all milk offered for sale, if not obtained from tubercle-free herds, should be pasteurised. The Committee, however, advises that this proposition should not become operative for a period of five years, and presents certain reasons to justify this delay. While not insensitive to these reasons, the League is of

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opinion that the period of postponement should be substantially reduced, and that powers of restriction should not be confined to the larger health authorities.

(10) The League fully shares the Committee's doubt that the general cleanliness of milk would be improved by the proposal to offer a bonus to selected producers —to be known as accredited producers—who attain a standard of cleanliness which is within reach of, and should be made compulsory on, all producers. " Accredited " milk (as it would assuredly be called) would no doubt appeal to the public as milk guaranteed to be satisfactory. Yet it would not be obtained from tuberculin-tested herds ; the cows yielding it would undergo a general veterinary examination only once in six months ; and the protective necessity for pasteurisation or boiling would be ignored. " Accredited " milk, in short, might perhaps claim to be " clean " ; it certainly could not claim to be " safe."

(11) The League recommends that in future all licences for the production of any of the designated milks should be authorised by County Councils and County Borough Councils in order to secure uniformity of administration ; also that it should be the duty of County Councils or County Borough Councils to ensure that all milk offered for sale in their respective areas corresponds to the standard recommended in the Cattle Diseases Committee's Report, namely, approximately that of the existing " Grade A." In addition, adequate medical supervision and control should be exercised over the health of all persons employed in the production, processing and distribution of the milk supply.

(12) The League urges strongly an examination at least every three months of all milking cows until such time as a tuberculosis eradication scheme is well under way. The views of the Committee as to the advantages of such inspections are noted with satisfaction. Probably in some parts of the country one veterinary officer would be able to conduct quarterly inspections of as many as 10,000 cows, *i.e.*, 40,000 inspections annually. There are districts, however, where it would be difficult to carry out more than half this number of inspections.

(13) The League favours the reservation of Sir Merrik Burrell as to the expanded veterinary services being organised and worked under central authority. The best results in an eradication scheme are likely to be obtained by utilising all sections of the veterinary profession under a central Government department. Even those who favour a local scheme of administration agree that the final or acceptance test should be carried out by an officer of the central Government.

(14) The League has noted the Committee's recommendation that the veterinary officers taking part in the scheme should possess the post-graduate Diploma in Veterinary State Medicine (D.V.S.M.). It should be pointed out, however, that at the moment this is impracticable, as the Diploma has only been in existence for some twelve years and is held by few persons. It is agreed that preference should be given to persons holding additional qualifications such as D.V.S.M. or B.Sc. (Veterinary Science), but such qualifications are not regarded as absolutely essential.

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(15) Special sales for cattle free from tuberculosis should be encouraged. This would be a great convenience to those taking part in an eradication scheme, and would also benefit those wishing to sell tubercle-free animals. It would obviously be of the first importance to protect cattle exposed at such sales from the risk of infection in the markets.

Signed on behalf of the Special Committee,

OLGA NETHERSOLE,
Founder and Honorary Organiser.

12, STRATFORD PLACE,
LONDON, W.1.
August 14th, 1934.

Clinical Articles

Clinical Notes from East Anglia.

By J. C. TAYLOR, M.R.C.V.S.
Beccles, Suffolk.

(1) Fractured Forearm in a Bovine.

History.—On April 28th, 1934, owner requested immediate attendance, stating he had a valuable Red Poll heifer which had been kicked by a pony, and that he feared that a forelimb had been fractured.

Subject.—Red Poll heifer, about one and a-half years old, in good store condition.

Examination.—Having secured the beast, it was found that there was a compound fracture at the junction of middle and lower thirds of the radius.

Treatment.—As the patient was very restive and nervous, she was gently cast on the unaffected (left) side. Reduction was easy, but difficulty was experienced in keeping the fractured ends of bone in apposition. The skin wound was cleansed and dressed. The fracture was set, and forearm immobilised with a bandage over cotton wool, in which a window was provided to facilitate drainage from and dressing of the wound. A pitch bandage was then applied over the first bandage, extending above and below it as far as the olecranon process above and the carpus below. Pitch at moderate heat was applied directly to the skin above the olecranon to assist in keeping the bandage up, as a tendency to slip down was evident. A protective canvas covering was applied over the pitch to prevent adherence to bedding and other limb. Temporary splints were also fitted to keep limb rigid until the pitch had time to set; splints were left in position with a couple of loose bandages, which remained *in situ* until pitch was thoroughly hard, and were then removed. A very guarded prognosis was given.

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Result.—Heifer fed well on day after the accident, and continued to do so. By May 9th, 1934, weight was being put on the affected limb. A week later she was walking fairly well. Dressings were then removed. Wound had healed perfectly, having been dressed daily with a powder containing p. ac. bor., p. zn. ox. and iodoformum. Animal was still lame, but got about very well. She was fed in a yard for another month, and then turned out to grass with others. She is still at grass, and is being kept for breeding, having made a perfect recovery.

Discussion.—This case was undertaken at the special request of the owner, who wished to ascertain by experiment whether the promiscuous shooting of bovines with fractured limbs sometimes indulged in by R.S.P.C.A. officials, was ever necessary or desirable. He had seen a case where an animal of this description was shot on a market yard by one of these officials without the owner's consent or a veterinary surgeon's examination, so this case of his own occurring shortly after was of peculiar interest to him, especially as result was so satisfactory.

(2) Broken Wind in an Unbroken Filly.

History.—On September 25th, 1934, my Principal was requested to examine a filly as to soundness, when attending a horse sale.

Subject.—Grey cross-bred Percheron filly, two years old, unbroken.

Diagnosis.—Double expiratory movements were very well marked. No heart lesion or other possible cause for the condition was evident. There was no history of any previous throat or chest affection. As the animal was obviously not " sound in the wind " she was rejected. My attention was called to the case, which was very interesting in view of the age and unbroken condition of the animal. Neither my Principal (Major W. H. Wortley) nor I had previously seen a case of " broken wind " in a young unbroken animal, and it would appear that the condition is rare in such stock.

(3) Black-Quarter in Cattle.

During the summer of 1934 some further isolated cases of black-quarter occurred on the same lands as the series of cases mentioned in " Clinical Notes from East Anglia," as published in THE VETERINARY JOURNAL, November, 1933. Some owners failed to take the precaution of having all young stock immunised before turning them out on the infected pastures. In three cases one or two deaths occurred. All in-contacts were at once given a dose of black-quarter serum, followed four days later by a dose of black-quarter Aggressin. There were no further casualties. Owners who took the precaution of having all young stock immunised with Aggressin alone before turning them out to grass had no losses. The serum and Aggressin used in each case was obtained, as in the previous year, from " The International Serum Company," Norwich, who also supplied the pneumonia and dysentery serum mentioned in previous notes.

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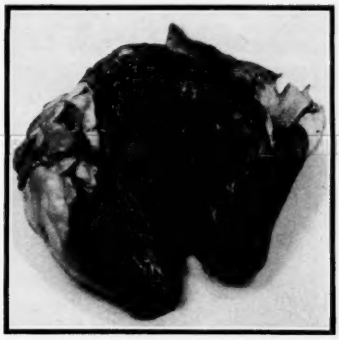

Tumours in the Heart of a Bullock.

(*Article by* R. Hudson, F.R.C.V.S., *page* 461)

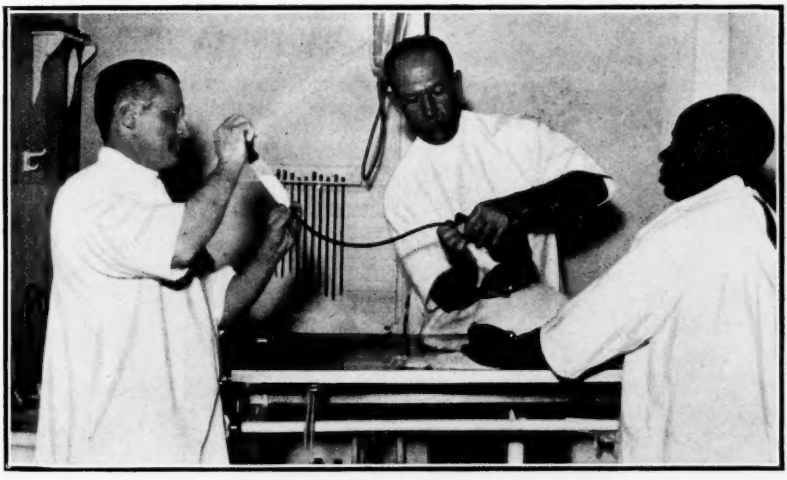

FIG. 1.—Using the stomach tube with help.

(*Article by* J. Gilbert Horning, D.V.S., *page* 462)

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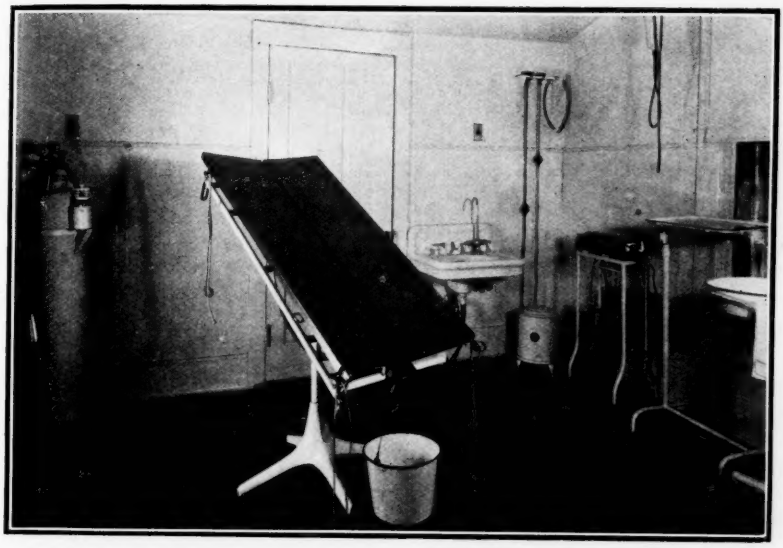

FIG. 2.—View of operating room, showing table, ether machine, stomach tube racks, etc.

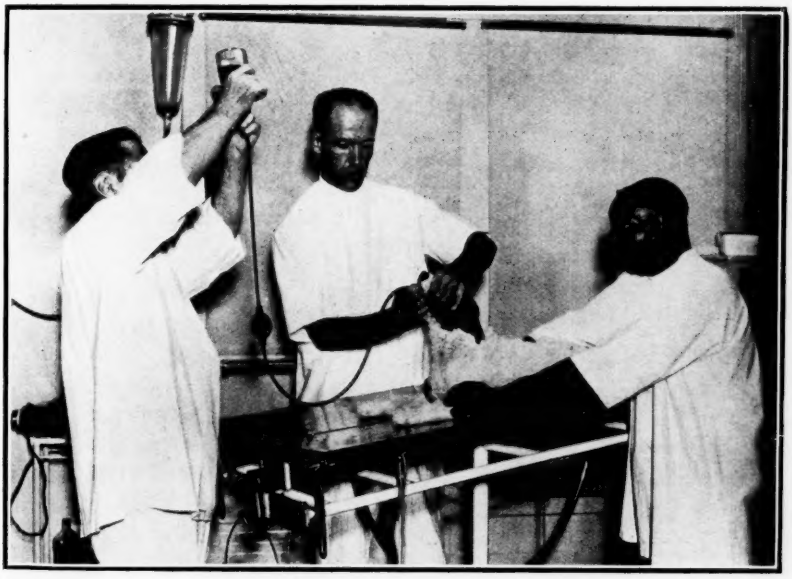

FIG. 3.—Using the stomach tube with syringe.

(*Article by* J. Gilbert Horning, D.V.S., *page* 462)

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An Unusual Case of Choking in a Cow.

By Y. S. GRASOVSKY, M.R.C.V.S.
Palestine.

WHEN called to treat a choked cow it was after failure of the owner and his neighbours to relieve the condition. On arrival I found the subject, a crossbred cow, much bloated, restless and exhausted. The site of the obstruction was detected immediately. It appeared as a circumscribed, firm swelling, as large as a fist, in the left jugular groove, and located in the region of the third to fourth cervical vertebræ. Palpation left no doubt as to the nature of the condition, *viz.*, obstruction of the œsophagus.

Hearing that the case is of several hours' duration, and seeing the general grave condition of the patient, tapping was the first step taken. This slightly calmed the cow and allowed me to proceed with the next step, which consisted of a series of efforts to dislodge the obstruction. To facilitate this the animal received half a pint of olive oil before the manipulation commenced. The jaws were held open with a gag, and an assistant endeavoured to push the obstruction, from the outside, towards the buccal cavity. With my hand introduced into the œsophagus I could feel the foreign body, but could not grasp it or pass my fingers above or below it so as to slide the substance into the pharynx, and then to withdraw it through the mouth. Several such unsuccessful attempted manipulations tried for half an hour increased the respiratory distress to such a degree that tracheotomy was performed. The above-described manipulations were then tried again, together with an effort to slice the object into small pieces. All attempts failed. Up to this time patient was standing, when suddenly she fell to the ground. Œsophagotomy was performed as a last resort. The œsophagus was incised just above the obstruction, but at this moment the animal died. Post-mortem examination revealed the cause to be a whole turnip. At the place of obstruction there was a tumorous growth, probably a fibromyxoma or fibromyoma the size of half a walnut.

Tumours in the Heart of a Bullock.

By R. HUDSON, F.R.C.V.S.
Retford.

THE subject was a two-and-a-half-year old bullock. It was bought for feeding during spring, and as summer advanced it was noticed that he was not doing satisfactorily. He was taken into the yard and helped by better feeding, but although he maintained his condition he did not fatten. One day he was found in a fit of some kind, from which he recovered without ill effects. Two more similar fits occurred, and I was then asked to see him.

I found him feeding well. There was œdema of the skin and subcutaneous tissue at the intermaxillary space extending to the throat along the under side of the neck to the sternum. The jugular veins were prominent, and could be

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seen like thick cords. The pulse and heart sounds were ill-defined, probably owing to the infiltrated surrounding tissues. The case was diagnosed as traumatic pericarditis, or valvular endocarditis, and being in fair condition the bullock was sent for slaughter. The excitement of removal from the lorry brought on a heart attack which caused him to fall, and the butcher promptly stuck him. The heart when opened showed the right auricle to be full of tumours growing from the wall of the cavity. As will be seen from the photograph, they almost filled it. Dr. Bruce Perry (Bristol) reported to me that the tumours were lymphosarcomas.

The post-mortem examination also showed another interesting condition, viz.: at the entrance to the pelvis there were two enlarged lymphatic glands as large as grape fruit. The centres of each were full of blood-clot, and from them blood had escaped into the surrounding tissues, forming on one side a sac distended with blood and clot twenty inches long by seven wide. On the other side the sac was similar, but not quite so large. I have been unable to find out what the disease in the glands was, nor how to account for the extensive hæmorrhage, but it must have been present for a considerable time. No other glands were noticeably enlarged.

Use of the Stomach Tube in Dog and Cat Practice.

By J. GILBERT HORNING, D.V.S.

Houston, Texas.

ABOUT 1920 I first realised the great value the stomach tube would be in dog and cat practice, and in March, 1924, with Dr. Glen Kirkwood, published an article in *Veterinary Medicine* on my findings, recommending its use as a practical adjunct in this field of our profession, giving my technique of administration, with suggestions for its use. The favourable reception of this article showed that I was not alone in my appreciation of the wonderful possibilities of this instrument, and requests for reprints and data on technique have been coming in even to this date.

When one stops to realise that disorders of the digestive tract are among the commonest conditions met with in dog and cat practice, they can well understand that in even a limited practice of this kind there is daily opportunity for employment of the stomach tube in either lavage or gavage. To present this subject as fully as possible, many things have to be taken into consideration: classification of the patient, as much data as possible about the stomach in particular and the patient in general. Knowingly or unknowingly, as soon as a patient is presented to us we immediately start to classify the animal: this in direct ratio to our knowledge of the class of animal presented.

In dogs and cats all individuals vary to a certain extent, so it is up to the clinician to visualise the animal before him, consider the type, and with this knowledge of the normal anatomy of the parts re-shape it in conformity with that individual. There are many text-books that can be used to review and

familiarise oneself with our patients, and also be used as an ever-ready reference. Mention will be made of a few that I have found of great help.

" Atlas of the Anatomy and Physiology of the Dog," by Professor Sir Frederick Hobday, C.M.G., F.R.C.V.S., F.R.S.E., and Harold Stainton, F.R.C.V.S., published by Baillière, Tindall & Cox, 8, Henrietta Street, Covent Garden, London, W.C.2. This is a splendid book, and in my opinion should be in the possession of every veterinarian. The cost is nominal, about five shillings net, and an expenditure you will always congratulate yourself on every time you read the book. " The Anatomy of the Domestic Animals," by Septimus Sisson, S.B., V.S., published by W. B. Saunders Company, Philadelphia, Pa. This is another essential book for the veterinarian, and is so well known that it need hardly be mentioned here. The writer had graduated before this book was published, and, for the benefit of those who graduated under similar circumstances, will say : if you do not have this book in your library, order one at once. " Pure Bred Dogs," published by the American Kennel Club, 221, Fourth Avenue, New York, N.Y. This book gives the standards of all breeds of dogs accepted by the American Kennel Club, with a photographic cut of specimen of each breed : the best book of this type that I know of. The Cat Standards of the American Cat Association can be purchased through Mrs. Geo. P. Kessler, 3821, Jackson Blvd., Chicago, Ill., and that of the Cat Fanciers Association from Mrs. G. E. Taylor, Henry Clay Hotel, Detroit, Mich., at about $25 each. " Diseases of the Cat," by Hamilton Kirk, published by Baillière, Tindall & Cox, London : A valuable book for study and reference.

The art of practising medicine is largely the act of noticing, and the more we notice and study, the better able we are to practise that art. The privilege of holding a post-mortem is frequently granted us, and this gives a splendid opportunity to continually improve our knowledge and, with the new interests created, inoculate us with enthusiasm for further study.

While logically it might be better to discuss the stomach and then give the technique of administration of the stomach tube, as this article is strictly for the profession, the technique will be given first.

Technique of Administration of the Stomach Tube.

The technique of administration of the stomach tube to dogs and cats is in most cases simple ; however, it is strictly a professional procedure, and can be capable of producing serious results. Naturally, as one progresses in its use it becomes easier, but it is always best to select very docile animals for the initial attempts. Fractious patients are better let alone entirely, regardless of how skilled one is. I write this after fourteen years' experience. Fortunately, there are few cases of this type that one encounters. Patients having a naturally pleasant disposition, or being weak from illness, can be handled satisfactorilly by one man skilled in the administration of the tube. At our hospital most of the cases are handled on the table, except those just stated. Patients that repeatedly receive the tube often become willing subjects.

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The attitude of the operator and his assistants has a decided value on the patient's response. It is somewhat difficult to describe what I mean: first, would be a sympathetic feeling for the patient; the friendly handling of the animal—never rushing to accomplish the act; the relaxed manner of every individual to relieve the possible tension of the patient; the gentle but firm restraint; talking to the animal; the use of a light touch to open the mouth; a varying approach depending upon the individual handled: all are factors involved in successfully treating and handling our patients. In some cases force has to be used, but properly used, creates confidence and easy handling eventually.

The patient is held on the table as shown in Figs. 1 and 3; this is the usual procedure for all dogs; cats are always wrapped securely in a square of heavy ducking (canvas), and then held on the table. After moistening the tube with water, the operator opens the patient's mouth and passes the tube gently and slowly back over the tongue; when the animal starts to swallow (this varies, sometimes it is decidedly noticeable, other times quite faint), the tube is by this action of the animal and the operator passed into the pharynx and œsophagus, and rapidly passed into the stomach. One can rapidly and harshly insert the tube back over the tongue, and in the majority of cases enter the œsophagus; one might also enter the trachea: there is this possibility in any style of operation on passing the tube. But the slow, gentle start, with the almost imperceptible pause for assistance of the animal in guiding (swallowing) the tube, creates just that difference between a good performance and the possibilities of a bungled one.

Should you enter the trachea the animal will sometimes cough. If there is still a doubt in your mind pass more tube, gently of course; measuring the tube on the outside of animal with its approximate course in the body will give the operator an idea about the length of tube needed; the trachea is always the shortest route, and the stomach will always take more tube. If in the least doubt, pull out and start over again. When you think entrance into the stomach is made, listen at the exposed end for rhythmic breathing of the animal, as you can notice from watching his sides, or place the exposed end in a glass of water; if much air comes out at expiration withdraw (in most cases a certain amount of air comes out of the stomach), use every precaution; you can always withdraw and start over again; so feel safe and be safe. Again, we come to this proposition of study and practice: study your subject and practise the operation—all will aid in perfecting your technique and make your work more interesting.

When you use the tube in the stomach for the copious injections and rejections of water or medicated water, this constitutes stomach washing or lavage. In using the larger tubes with bulb and funnel, pour in the liquid after passing tube, then lower the outside of tube with funnel and pump the bulb, this will start liquid to syphon out of the stomach. With the shorter tubes and syringe pass as much liquid as thought necessary through the tube with syringe, then queeze bulb of empty syringe attached to tube, at the same time lowering; as the liquid starts coming out withdraw syringe and syphon out the fluid from stomach.

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The introduction of liquids or semi-liquids into the stomach by the aid of the stomach tube is called gavage. After passing the tube into the stomach, pour through the funnel as in Fig. 1, and if the liquid runs slowly, gently squeeze the bulb and help it along ; or with the shorter tubes, pass the tube, attach the filled syringe to the exposed end, and exert pressure on the bulb, as shown in Fig. 3.

Have the right set of tubes—I wish to lay especial emphasis on this point: flabby tubes, regardless of your good technique, will give uncertain performance. The tubes are inexpensive, and a good set costs no more than a poor one. Get a complete set, so you won't be using the wrong-sized tube on your patient. When you have a damaged tube, order an immediate replacement at once. While the more you practice, the better your technique should become in passing the tube. Regardless of how good you are, you will have an injured tube occasionally: this in most cases when the owner interferes while the operator is passing the tube, nervousness of the patient after the start is made, etc.

Clay-Adams Co., Inc., 25, East 26th Street, New York, have arranged a set according to my specifications that can be purchased through the veterinary supply houses, and I recommend that they be purchased through them. The set consists of: soft rubber tube, 16 in., sizes 12, 16, 22 (French) ; cotton woven tube, 16 in., sizes 12, 16, 22 (French) ; soft rubber tube, 30 in., size 22 (French) ; soft rubber stomach tube, 60 in., size 22 (French), with bulb and funnel. Becton, Dickinson & Co., Rutherford, N.J., No. 2082 2 oz. Asepto syringe. All shown in Fig. 2.

The racks for the stomach tubes and the Becton, Dickinson syringes are home-made, and can be made by any carpenter, painted a flat white, and then painted with two coats of white Vitrolite. It may be somewhat out of line with this article to mention the reason for the battery of the three B-D syringes as noticed in Fig. 2, but with us we use the far one for rectal or vaginal work, the middle one for abscesses, and the near one for a dose syringe, their glass body and snout permits boiling in the steriliser, and we have found them of great value in our work. They can be purchased through your veterinary supply house. At first we sterilised the tubes, but now we use hot liquor cresolis compositus solution to wash the tubes, then rinse them in warm, clear water, dry the outside, and hang in the rack. Where it is thought necessary to boil the tubes, the rubber ones are used instead of the cotton woven, lacquered ones, although it is seldom necessary. Naturally in our contagious ward we have a set of tubes for use there.

Follicular Mange: A Suggested Treatment of the Secondary Bacterial Invasion.

By C. E. WOODROW, M.R.C.V.S.
Chiswick.

It is not the purpose of this short clinical communication to discuss the general primary treatment of mange in the dog. Much has been written on this subject, and in practice each practitioner has his own favourite treatment. The life-

history of *Sarcoptes scabii* is well known, and the method of infection and spread understood, and we regard sarcoptic mange as readily amenable to treatment.

It is when we come to consider the follicular type that we find ourselves without any very definite knowledge. The writer has been unable to find published results of any research work that would throw a more certain light on the problems that still confront us: the life-history, habitat and method of infection. We are even told that the *Demodex folliculorum* is demonstrable on a proportion of healthy skins, and recently some doubts have been cast on the hitherto fundamental belief that this parasite is responsible for follicular mange. We recognise from clinical observation a definite hereditary tendency, and the disease assumes greater significance as those breeds which are held to have this tendency, such as the dachshund, become more popular. We give a favourable prognosis with some certainty when we are shown a clear-cut case of sarcoptic mange, but how often in practice does one meet with indeterminate cases, cases of mixed infection, cases in which one cannot demonstrate the parasite. It is well known that the follicular parasite rapidly disappears under even the most simple treatment, and many of our patients have had such treatment before we are consulted. It is this type of case, together with the known follicular type, on which we hesitate to give any definite prognosis. We feel rather helpless in face of the limited time factor imposed on us by most owners, and even after the discharge of what seems at the time a most successful case, we have that unhappy feeling that we shall be seeing it again within a very few months.

It has been the writer's opinion for some time that this difficulty of treatment and danger of recurrence are entirely due to the secondary bacterial invaders, and not to the demodex, which rapidly disappears and can rarely be found on any second examination. Staphylococci, and to a lesser degree streptococci, are always present in the skin, and rapidly invade the hair follicles and sebaceous glands, whose natural resistance to such invasion is broken down by the presence of the demodex and its toxins. Our dressings appear to destroy the demodex, but to have little or no effect on the secondary cocci. A second belief goes hand-in-hand with this: that is, that the condition is usually aggravated and certainly prolonged by a sulphur dermatitis. This is often true even in sarcoptic cases, but more certainly in follicular, where we have been in the habit of giving a longer course of treatment in view of its intractable nature.

After consideration of these facts, the following course of treatment was evolved. The affected dog is clipped out completely, and washed and scrubbed in a soda bath to remove all the encrusted scabs and scales. When dry, one half of the body is dressed, with meticulous thoroughness and good rubbing, either with Odylen (Bayer), or a sulphur dressing in an oleaginous base. After two days the other half of the body is similarly dressed. This process is repeated again after a further two days, and the dog is then washed out. This treatment, if done thoroughly, should eradicate all adult parasites and larvæ, and the second phase commences—the elimination of the secondary bacterial invaders. As has been

said above, this is where our difficulty of a satisfactory treatment arises, and it is on this aspect that a good deal of work has been done during the last two years. After trial all forms of local treatment alone were rejected as being too uncertain and prone to rapid recurrence, and some form of successful general treatment was sought. It is accepted that it is not possible to produce a uniformly successful vaccine or serum from the various types of staphylococci and streptococci. Both stock and autogenous vaccines were discarded, after some successes but many failures, in favour of various chemical preparations: arsenic, manganese and tin in the varied forms in which they are presented for hypodermic medication.

Attention was then directed to non-specific protein therapy. Numerous workers have shown that the injection of various foreign protein materials causes a rapid increase in both the opsonic index of the serum and the antibody level. Numerous protein substances are used, both clinically and in the laboratory, to produce such effects, among which may be mentioned normal horse serum, placental extracts, casein, peptone, yatren, etc. Such injections are usually followed by a more or less severe reaction, and it was supposed that this protein shock was a necessary, if unpleasant, part of the treatment. It has, however, been found recently that such shock is not necessary for the establishment of therapeutic action.

In November, 1933, the writer decided to try a preparation named "Antibacsyn," about which he had heard excellent reports in the treatment of human furunculosis. Antibacsyn is a suspension in carbol saline of serum euglobulin (derived from ox serum) absorbed to the hydroxides of calcium and magnesium. It has the two great advantages of being entirely free from any shock following injection and of being standardised both by chemical methods and biological assay. Being isotonic, the injection process is almost painless.

Numerous charts have been prepared by the manufacturers showing the increased white count following within twenty-four hours of injection. Thus, one shows in man a rise from 10,000 to 20,000 (cells per cmm.) in twenty-four hours, while a second shows a rise from under 10,000 to over 25,000 within six hours in a guinea-pig. These laboratory observations are well borne out in practice, and the sudden leucocytosis in the pyogenic skin conditions with which we are dealing here gives one a most satisfying and striking clinical picture.

So in the second phase of treatment three injections of 2 c.c. each of Antibacsyn are given at intervals of three days. No harmful reaction of any kind has been observed even in the most delicate breeds, and it has been rarely necessary to continue with a fourth injection. The success of this treatment in the writer's hands can best be shown by the fact that it is now taken for granted that both the diffuse dermatitis which arises by spread of staphylococcal infection from adjacent hair follicles, and which is usually moist, as well as the more superficial scaly dermatitis apparently caused by streptococci, will be cleared up in one week. The deeper furunculosis extending into the chorion and the sub-

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cutaneous tissues, frequently resulting in multiple large abscesses by coalescence, usually responds to treatment within two weeks.

It has been usual to finish off the treatment during the third week by two more half-body skin dressings, to ensure the destruction of any larvæ that may have hatched out from eggs left unharmed by the first applications, but recently this has been omitted in some cases without any evidence of recurrence at a later date. It seems possible that any larvæ that do hatch find themselves in such sterile surroundings, due to the increased leucocytosis and subsequent healing of the hair follicles, that they are unable to obtain a hold and rapidly perish.

Some case reports are added dealing more particularly with cases in which circumstances necessitated variation in the treatment outlined above.

(1) Dachshund bitch, aged seven years, admitted July 3rd, 1933. Started as a case of squamous follicular mange, and generalised furunculosis soon appeared. Throughout September, October and November, there were many times when it was impossible to find any area of the skin that was not involved by abscess formation. The case seemed quite hopeless, and it was only persevered with through the great wish of the owner. During August, arsenic injections were given ; September, injections of manganese butyrate and spleen extract ; October, ultra-violet lamp ; early November, collosal manganese. During this time the abscess cavities were kept constantly cleaned, curetted and drained, but new abscesses appeared faster than the old ones healed. The bitch was completely denuded of hair. On November 17th, the first injection of Antibacsyn was given, and repeated on the 22nd and 27th. Two more injections were given on December 2nd and 4th. The bitch was discharged on January 10th, with all abscesses healed and a new coat rapidly growing. She was only detained for the latter part of December and early January because of the illness of her owner. She has been under constant observation since that time, but only one more small abscess developed, which responded immediately to one more injection.

(2) This case is interesting as affording some comparison between treatments. Smooth fox terrier dog, eighteen months old, admitted to hospital May 5th, 1933, with multiple deep abscess formation and superficial sores along the whole of the back and neck. No parasites demonstrable. Treatment consisted of lancing, curetting and antiseptic lotions, with injections of manganese butyrate. Discharged half cured May 29th, but returned to hospital June 24th to July 12th, and during the interval was brought to the surgery for dressings. 1934 : admitted April 28th, in exactly similar condition. Antibacsyn injections were given on May 1st, 3rd and 5th, and the dog was discharged on May 9th, with every abscess healed, but with some thickening of the skin remaining, which had almost disappeared when brought for examination on May 15th.

(3) Bedlington dog, aged ten months. January 25th, 1934, typical squamous follicular mange ; parasites easily found, considerable thickening and wrinkling of the skin. As this case belonged to a doctor who lived in a remote part of London,

home treatment was suggested with Odylen and Antibacsyn. When seen again on May 10th, there was a slight recurrence along the lower part of the back. Three injections of Antibacsyn had been given, but only a very sketchy skin dressing had been carried out. One complete dressing was suggested with three more injections of Antibacsyn. This was done, and the dog was not seen again until October 29th, when both skin and coat were in perfect condition.

(4) Scottie dog, aged three years : a case of mixed infection, largely pyogenic, with considerable thickening and wrinkling of the skin ; great loss of hair. This dog was treated, from November 29th, 1933, to December 20th, with the usual skin dressings without any signs of improvement. On December 20th, the first injection of Antibacsyn was given, and followed by two more at intervals of three days, and the dog was discharged on January 17th, completely cured. It was returned for stripping at the end of June, when the skin was found to be in normal condition.

(5) Wire-haired fox terrier, three years : January 13th to February 2nd, 1934. Squamous follicular parasites found. This dog had been affected for over two years.

(6) March 3rd to 26th, 1934. Airedale : follicular, pustular type, with large coalescent sores on head, neck and legs.

(7) June 15th to 29th. Wire-haired terrier, aged two years, probably general mixed infection, with pyogenic element predominating. This dog had already received extensive sulphur and oil dressings at home.

Cases 5, 6 and 7 are inserted as more or less standard methods of treatment. Each case received three injections of Antibacsyn ; (7) no skin dressings of any sort were given. All three responded excellently to treatment, and there has been no recurrence.

(8) This was in the nature of a mass treatment of a kennel of cocker spaniels in an attempt to eradicate a general mixed mange infection predominatingly follicular in type and showing all the variations of secondary pyogenic invasion. It had been in existence for two years or so. In May, 1934, all skin dressings were discontinued, and a course of Antibacsyn injections was given to thirteen dogs. In five of these cases the infection was not severe, but consisted of small hairless and scaly patches round the hocks, elbows and ears. This represents a condition that is frequently found in large kennels, and is very heartbreaking to the owners, as it necessitates repeated dressings, and there is constant recurrence. The affected dogs can never be brought into good coat. Four more were badly affected, the whole skin being dry and greyish. Large areas, particularly involving the ears and hind extremities, were denuded of hair, the remainder of the coat being sparse and very scurfy. Three more could be classified as being half-way between these two extremes, and the last was a case of persistent moist eczema. Nine received three injections of Antibacsyn, while the four that were badly affected received from four to six. Results of the treatment may be taken as very satisfactory. One case responded well throughout May and June, but

broke down again in July, and was put down. The remaining three of the badly infected cases cleared up completely, growing a good thick coat, the skin becoming healthy and the normal light-pink in colour. The only other treatment given was occasional baths to clear away all dead hair, scurf and skin debris. The case of persistent moist eczema cleared up particularly rapidly, but has had some slight recurrence at intervals later. Of the five least affected, three have shown no further trouble, while two only have failed to clear up satisfactorily.

(9) Bedlington bitch, aged four years, when examined on November 15th, 1933. This bitch presented a most appalling spectacle of a generalised moist pyogenic dermatitis. The head and neck were bandaged, and at least one half of the skin surface consisted of weeping sores. The ear-flaps and neck were almost completely denuded of epithelium. A quick and painless exit seemed the only solution, as she had suffered to a lesser degree from this condition throughout her life. Although she had bred excellent puppies, her owner, after a year of persistent effort, had given her up and presented her to another breeder. The second owner had likewise persevered for another six months. As she was brought into hospital at the time the writer was making the first trials of Antibacsyn, it seemed to present a good, if difficult, test of the treatment. Evaporating skin lotions were applied externally, and a course of three Antibacsyn injections were given, followed in another fortnight by another two. She was discharged from hospital on January 12th, 1934, completely cured. The length of time taken for this case is explained by the fact that the desquamation of epithelium was so extensive that repair had to take place by new growth of epithelium spreading in from the edges of denuded areas, which in two places were as large as the palm of one's hand.

(10) Bedlington bitch aged two years. Admitted May 24th ; had been under skin dressings for mange for three weeks. Could we get her right for export on the 31st ? It seemed very improbable, as there were some half-dozen areas left which were hairless, grey and thickened. Three injections were given, and it was possible to pass the bitch on the 31st with a clean export certificate, the patches at that time showing clean, healthy skin, with a downy growth of new hair. Word was received from Germany some months later to say that there had been no recurrence.

Summary.—The author states his opinion that the lengthy and often unsatisfactory treatment of follicular mange and allied skin conditions is entirely due to secondary pyogenic infection. He deprecates the prolonged use of sulphur dressings as likely to aggravate the existing skin condition with a sulphur dermatitis. In the treatment of the secondary pyogenic phase he claims to have had the best results from non-specific protein therapy, and suggests the use of Antibacsyn in 2 c.c. doses at intervals of three days. He suggests in untreated cases a preliminary course covering eight days of sulphur dressings, to be followed by Antibacsyn injections during the next one to two weeks, with a final sulphur dressing to finish the treatment. Some case reports are added to illustrate the results of this treatment.

A Case of Collapse and Hæmorrhage.

By G. MAYALL, M.R.C.V.S.

Bolton.

A FOX terrier dog, "Terry," was brought to me in a state of collapse and bleeding profusely from the nostrils, and grazed and sore about his jaws. The history was that he had been run over by a motor car, and he was evidently badly injured. I dressed his nostrils, mouth and jaws with hazeline, gave him a hypodermic injection of camphor oil (one in five), and a dose of medicinal paraffin. I could not detect any kidney injury, but he was slightly tender over the loin region, and quite unable to stand up. By trickling dilute hazeline down the nostrils the hæmorrhage was somewhat allayed, but altogether the little fellow lost quite half a pint of venous blood, and bled somewhat again during the night. Hot bottles were provided for him, and next day I found him better than I expected, and able to raise his head, but not to get up. I had some dextro-calcium in the surgery, but except for the treatment of milk fever, I found a lamentable lack of information as to its therapeutic effect in the text-books on materia medica that I have. However, on looking up my latest books of transient therapeutics, I found that it decreases the clotting time of blood, and is claimed to favour the cessation of hæmorrhage, and may be given before operations and in hæmophilia; also, one hand-book says: It is useful in cases of prostration in horses, cattle, sheep, pigs and dogs. I therefore proceeded to give "Terry" a hypodermic injection of 60 minims of dextro-calcium in the morning. In the evening he showed much more signs of life, and looked up and drank some cold water. Next day, May 9th, I gave him a second hypodermic injection of dextro-calcium, and in the evening he got up and staggered about on his feet and was rocky behind, as if there was some slight concussion of the spine. He soon went down and sank peacefully beside his hot bottle. Next day he took two lots of cold milk and some Roboleine, and the following day some light digestible food. There was no recurrence of any hæmorrhage after the first day and night. We dressed his spine daily with anodyne liniment; he went out on May 14th, seven days after the accident, showing only slight stiffness in his gait behind. I told the owner to let him go out on a grass lawn daily, and he seems now quite recovered.

Spontaneous Recovery of Sheep Affected with Liver Fluke.

By R. HUDSON, F.R.C.V.S.

Retford.

A FLOCK of eighty in-lamb ewes was divided into two lots of forty. One lot remained at home, the other was sent to another farm. No effort at selection was made, and the flocks were practically even. All of them were purchased up north at the back end sales, put to the tup, and kept on safe, free-from-fluke land, until they were divided about March. Neither farm has any history of liver fluke. The affected sheep were affected when purchased.

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The forty sent away went to an upland clay-land farm to clean grass land, and were allowed good hay. They soon began to lose condition, and after having been there about a month three died and two were slaughtered. I was called to see them, and found them to be affected with advanced liver fluke disease. The remainder (thirty-five) looked a bad lot. They were weak and anæmic, heavy in belly and slack in their backs. The owner (an experienced farmer) and I both thought they would all die, for they had lambing to face. I suggested killing the best of them. He decided to get them home. They were too ill to walk the distance of about three miles, so they were fetched by lorry. On arrival they were turned on pasture along with the other flock, and soon began to mend. No drugs were given; no concentrates. As they approached lambing time mangolds were given. They lambed with not more than the usual loss. The land they went back to was feeding land, perhaps as good as any in England. The flock which remained at home never showed a sign of illness.

It would appear that the change to poor upland pasture affected the flock which left home, in that the pasture was not good enough to keep them strong and enable them to resist the attacks of flukes; but the surprising fact about the case was that sheep so badly affected should recover on any pasture. I think it was fortunate that they were able to do it on grass or grass and mangolds alone, for concentrates do not help in advanced fluke.

Abstracts of Current Literature

Vomiting in the Dog as a Symptom of Different Disease Conditions. By J. P. Fooy. *Ned.-Ind. Blad. v. Diergeneeskunde*, Vol. 44; *Wien. Tier. Montschrft.*, 1933, p. 401.

The pathological forms of vomiting in the dog may be divided into two groups: To group 1 belong all cases where the gastro-intestinal mucosa is irritated (gastro-enteritic vomiting), to group 2 belong those cases where poison circulating in the blood excites the vomiting centre (toxic vomition). The pathological significance of gastro-enteritic vomiting is difficult in our domestic animals, and still sticks at its beginning. In human medicine one tests the stomach contents for the amount or presence of free hydrochloric acid as well as estimation of hydrogen ion concentration. Similar investigations can scarcely be undertaken in our animals. But in animals one can always observe the reaction of the vomited material, and so obtain a valuable clue to the therapy to adopt. The presence of blood in the vomit of flesh-eating animals has not the significance it has in man. Simple dyspepsia occurs frequently in dogs and expresses itself by vomition, and after a certain time the appetite diminishes or fails altogether. (Hungry and hasty-feeding dogs often vomit directly after food without dyspepsia being present; the dogs then have the impulse quickly to eat again the vomited material.) Therapy consists

above all in diet (scraped beef, milk and biscuit), and according to reaction of the vomit in dilute hydrochloric acid or bicarbonate of soda. Gastro-intestinal catarrh is difficult to distinguish from simple dyspepsia. In this vomiting occurs shortly after taking food. On palpation of the abdomen there is pressure susceptibility in the neighbourhood of the duodenum and pylorus. The body temperature is usually not raised and the fæces may be pulpy. Treatment consists in laxatives such as calomel. Gastro-enteritic vomiting may result from different causes. Occasionally a bad tooth is answerable. A greatly neglected cause is the purulent inflammation of the sheath, when in licking this inflamed part, ichorous pus gets into the digestive tract. In the tropics and from recent observation in more temperate zones a not infrequent cause is an attack by ankylostomes, which can be found in 50 per cent. of dogs. The worm plague in dogs is characterised by hæmorrhagic enteritis, whilst the analogous disease in man produces anæmia. The first sign of this disease in dogs is vomiting and diminished appetite. The species of worms (*Anc. duodenale* and *Necator americanus*) in man and dogs are not identical, and the question whether perhaps the dog is a source of infection for man may be answered in the negative. In young dogs vomiting may depend on ascaris invasion, but anæmia will then distinguish it from ankylostome disease.

Among the causes of toxic vomiting, most significance must be attached to uræmia and pyometra. Both maladies are accompanied with continued vomiting, complete anorexia and increased drinking. Kidney disease in dogs is very frequent. A great number of dogs have albuminuria without exhibiting general symptoms of disease. Œdema, which one often finds in kidney trouble in man, does not affect dogs. In animals a true uræmia occurs almost entirely; the blood is over-filled with urea, on which account an estimation of urea in the blood is indispensable for diagnosis and prognosis. In Dutch India a chronic uræmia occurs, and also an acute form leading to death in a few days, in which vomiting is pronounced, accounting for its designation as vomiting disease. The ætiology is not clear whether it is due to a specific organism or to leptospires. The clinical picture resembles that of Stuttgart disease. Another cause of toxic vomiting is pyometra, the diagnosis of which is difficult if the uterus is small, almost closed, and scarcely palpable. Injection of hormone preparation may cause the discharge of pus from the uterus. Urine examination reveals nothing. Differential diagnosis is established from the urea in the blood and blood examination. In uræmia one finds no especially pronounced changes in the blood forms; in pyometra, neutrophiles and pronounced distortion of the corpuscles to the left. In suspected pyometra a correct anamnesis is very important. Vomiting may also be a sign of commencing Weil's disease.

Copper Poisoning in Sheep. By Dr. J. A. Beijers. *Tijdschrift voor Diergene.*

The author describes a few cases of chronic copper poisoning in sheep which had been grazing in orchards sprayed with a solution of copper sulphate. The

clinical symptoms often make their appearance only after a long period, apparently shortly before death. Symptoms consist in: marked anæmia, icterus, hæmaturia, and hæmoglobinuria, bloody fæces. An accelerated pulse rate (due to anæmia and degeneration of the heart), normal temperature. Autopsy: fatty degenerative changes in the liver, marked parenchymatous degeneration of the kidneys, no inflammatory symptoms in the kidneys. Turnbull reaction negative. Spleen: Turnbull reaction positive. In stomach, liver, and bile, chemically, large quantities of copper were found (bile, 1 gram Cu. So4, stomach contents 130 mgr. per kilgr.).

Reviews

Parasites and Cancer. By LOMBARD. *Revue Vétérinaire et Journal de Médecine Vétérinaire et de Zootechnic Réunis*, lxxxvi, 361-384.

Is it merely a matter of coincidence, or is there any relationship of cause and effect between the coexistence of parasites and cancer? This question has been amplified and given a new aspect by work carried out during the last few years. Hypotheses attributing a causal relationship of *Ascomycetes*, *Blastomycetes* or *Sarcosporidia* to the existence of tumours in animals are now little more than objects of historical curiosity. The rôle of certain metazoan parasites in the genesis of cancer is more problematical. It was Borrel who, in 1906, found the Cysticercus of *Taenia crassicollis* in a sarcoma of the liver and in an adeno-carcinoma of the kidney of the rat first attributed the production of tumours to the presence of metazoan parasites. Since that time various worms and arthropods have been reported as having been associated with tumour formation. Of the worms, *Cysticercus fasciolaris*, *Cysticercus pisiformis*, *Fasciola hepatica*, *Opisthorchis felineus*, *Paragonimus westermanni*, *Muspicea borrelli*, *Spiroptera neoplastica*, *Habronema megastomum*, *Physaloptera tumefaciens*, bronchial and pulmonary strongyles in the sheep, *Trichostrongylus Axie*, etc., have been credited by various workers as possessing carcinogenetic properties. Similarly, Borrel and others have also attributed cancer formation to various members of the orders Acarena and Insecta. In attempting to assess the value of the above researches, it would be temerity to assert that the coexistence of these macroparasites and cancer is always a matter of mere coincidence. Experiment has indisputably established the pathogenic rôle of *Spiroptera neoplastica* and *Cysticercus fasciolaris* in this connection. The crux of the problem is the manner in which the parasites produce their effect. Some workers believe that the parasites act merely as mechanical or chemical irritants. Such is not the view of Borrel. He believes that parasites are necessary to tumour formation, even cancers produced by X-rays, tar, and various other chemical substances. These physical or chemical agents only prepare the way for the parasites, which in their turn sensitise the cells of the reticulo-endothelial system to the action of a carcinogenetic virus carried by certain of the parasites. Borrel searched forty years for this hypothetical virus, but the results of his method have so far not proved convincing. But the way shown by his studies has opened what it is hoped may prove a fruitful line of research. As yet too little work has been done for any conclusions to be drawn.

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News

OLD COMRADES ASSOCIATION.

THE fourteenth annual re-union dinner of the R.A.V.C., O.C.A., was held at Anderton's Hotel, Fleet Street, E.C.4, on Friday, November 2nd, 1934, at 7.30 p.m., and the attendance was well up to the average. After the loyal toast, the Chairman, Major-General W. S. Anthony, C.B., C.M.G., Colonel Commandant of the R.A.V.C., in proposing the toast to "The Association," said that not a single annual meeting had been missed since the inception of the Association. This had not been the case with all similar associations. He was not criticising the other associations, because they must have had good reason for failing to maintain the annual event. The R.A.V.C. Old Comrades Association had been able to maintain the annual meeting for fourteen consecutive years solely by the efforts of its Past-Presidents. They had been a source of constant encouragement to the members of the Association. Major-General Anthony also commended the Management Committee, the Treasurer and the Secretary. He acknowledged all they did for the Association. The finances had never been so good as they were this year. Great thanks were due to the unobtrusive work done throughout the past year by the Benevolent Fund, which had helped hundreds of cases. One purpose of the Association must be to go onward with the Benevolent Fund. There were many people present who had come from distant places. The date of the annual meeting was going to be changed for their benefit. They were present that night to welcome one another, and to greet new people.

Extending the Helping Hand.

Major-General J. B. Tapley, D.S.O., D.G., A.V.S., in his reply, referred to the comradeship and spirit which had been preserved throughout the years. It had enabled a helping hand to be extended to less fortunate comrades. He mentioned that the previous Saturday he had returned from attending a national exhibition held in Canada. He had never seen such loyalty to England as was there displayed. It was something which all might look up to. With regard to the future of the Association, Major-General Tapley felt supremely confident in the Committee and the Secretary, and had no fear for the future of the Association.

Among those present were: Major-General W. S. Anthony, C.B., C.M.G., (President); Major-General J. B. Tapley, D.S.O., D.G., A.V.S. (Senior Vice-President); Major-General Sir Layton J. Blenkinsop, K.C.B., D.S.O., and Major-General Sir John Moore, K.C.M.G., C.B. (Life Vice-Presidents); Colonel A. G. Todd, C.B.E., D.S.O., and Sir Frederick Hobday, C.M.G. (Vice-Presidents); Colonels W. H. Walker, D.S.O., O.B.E., H. E. Gibbs, D.S.O.; Lieut.-Colonel S. L. Slocock, M.C.; Majors E. G. Turner, D.S.O., C. Davenport, O.B.E., Glyn Lloyd, D.S.O.; Captain C. Budd, M.B.E.; Lieut. W. E. Turton and Messrs. W. Horsfield, W. G. Topham, D. F. Maccabe, R.S.M., C. A. Drew, and Staff Sergeant T. B. Crawford. Members of the Committee of Management: P. V. M. Sampson (Hon. Solicitor), and Captain A. J. Warburton (Hon. Secretary and Treasurer).

Other members present were: Lieut.-Colonel E. P. Argyle, D.S.O., Mr. W. F. Absolom, Majors W. E. Barry, D'A. S. Beck, E. C. Bowes, Capt. B. H. Benson, Lieut. R. S. T. Bowden, Messrs. W. B. Baldwin, E. P. Byles, F. L. Brealy, J. H. Briddes, G. Brown, C. Bott, M. Burtwhistle, Sergt.-Major P. G. Briggs

Major T. E. Campey, M.B.E., Capt C. Collingwood, Mr. L. J. Cordery, Mr. W. F. Crome, Capt. J. Daunt, Mr. W. Dowling, Lieut.-Colonel O. S. Fisher, Mr. J. R. Foy, Mr. E. R. Gregory, Majors J. B. Hare, C. Holland, M.C., W. B. Howe, Messrs. L. F. Hayes, A. E. Howard, H. M. Harker, J. C. Harrigan, E. Hickson, G. Humphries, P. J. Holland, H. E. Jones, F. Kirtland, W. T. Lewis, Major M. A. Murphy, Messrs. C. E. Mant and I. G. Moss, Staff Sergeant W. H. Mundy, Major B. J. W. Nicholas, Mr. J. Nash, Major G. E. Oxspring, Capt. E. S. O'Kelly, Major J. J. Plunkett, O.B.E., Mr. H. J. Reavell, Mr. J. C. Renwick, Major J. Southall, Lieut. A. D. Seton, Lieut. D. F. Smith, Messrs. S. T. Salt, D.C.M., G. Sillibourne, H. J. Stockton, T. J. Sutton, M.B.E., C. Sisley, B. J. Southwell, D. H. Thompson, H. E. Tott, Capt. G. S. Walker, Major P. Woodland, Capt. A. H. Webber, Mr. A. G. Wicks, R.S.M. J. Wood; N.C.O.'s and Men from No. 1 Depot Section, Woolwich; No. 2 Section, Aldershot; No. 3 Section, Tidworth; School of Farriery, Aldershot; and detachments from Shorncliffe and Colchester.

Letters of apology were received from Colonel H. J. Holness, D.S.O.; Lieut.-Colonel A. E. Clarke, Major H. E. O. L. Irwin, Major P. S. Sparling, Capt. J. F. Ives, M.C.; Capt. J. F. Macdonald, Messrs. T. Rourke, A. Henderson, H. E. Ison, A. H. Fass, R. Lumley and L. Norman. A fine programme of music was rendered by Mr. A. C. Ballinger's band during the evening.

The Annual General Meeting was held prior to the dinner, with the President, Major-General W. S. Anthony, C.B., C.M.G., in the Chair. The minutes of the last meeting were read and confirmed, also minutes of meeting of Committee of Management. A statement of accounts was presented by the Hon. Secretary and Treasurer, copies of which had been circulated to all members. This showed a good year financially, and after discussion at length the accounts were passed. Election of Committee of Management.—The Secretary reported that the following members had resigned owing to change of stations. Majors Macartney, Lloyd, and Staff Sergt. T. B. Crawford. The following were elected to fill the vacancies: Majors Sparling, Murphy, and R.S.M. Wood. After a general discussion it was resolved to put the annual dinner and meeting forward one month, namely, to the first Friday in October. A concession had been obtained from the railways whereby members could obtain tickets for the double journey for a single fare if they returned the same day, and for a fare and a third if they returned within one month of the date of the dinner. A vote of thanks to Major-General Anthony for so ably presiding at the meeting brought the proceedings to a close.

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